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Process and personality : toward a unification of psychological theory and educational practice.

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PROCESS AND PERSONALITY:
TOWARD A UNIFICATION OF PSYCHOLOGICAL
THEORY AND EDUCATIONAL PRACTICE

A Dissertation Presented

By

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DEDICATION

Sandra
Warren, Erica, Andrea, Ramin, Jaliéh
Paul and Leola

My wife, children and parents--those who have given most deeply that I could achieve completion of this task, are also those who can share most completely in the feelings which are in my heart in dedicating this work to them.

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The thought of adequately expressing one's indebtedness to others as an appropriate opening comment to the final version of a work that has consumed a major portion of one's energies over an extended period of time, elicits many feelings of varying character. There is, for example, great joy in completing a challenging task. There is also a sorrow which derives from aspects of the original expectations which remain, at this point, unfulfilled dreams. Closely tied with this are deeper feelings which derive from recognition of the degree to which one is supported by the help and encouragement of others--a help and encouragement which is often provided at the expense of personal desires. Many people have helped me and shared with me in ways that are important to these personal reflections. Within the immediate context of university studies, Professor Daniel C. Jordan and Dean Dwight W. Allen of the School of Education have provided, in many ways, by word and deed, an important example and impetus along the path toward greater educational development. The encouragement of Mr. Nathan Rutstein and Dr. Donald Streets is also gratefully acknowledged. In a larger context, it is to my family whose willingness and

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FOREWORD

The rapid growth of knowledge in twentieth century science, has had particularly important implications for the philosophical foundations of psychology and education. This dissertation is based upon the conviction that progress toward more meaningful theories in psychology and more relevant approaches to the practical concerns of education requires increased appreciation of the historical background of our present sciences and also a reinterpretation of the animating assumptions upon which much contemporary theory in psychology and education is based.

Within the circumscribed area of theoretical formulation in the behavioral sciences, this conviction translates into a three-phase process. First, it is necessary to examine the growth of psychological theory with the intention of relating the formulation of psychological issues to the larger context of scientific thought which was prevalent at that time. Second, the character of that general approach to science must then be compared to the current interpretation of scientific knowledge. Finally, in the third phase, it is then possible to consider the new possibilities for behavioral scientific theory which can be based upon our more powerful modern insights into scientific understanding of nature and the nature of scientific understanding.

Aspects of these three phases form the content of this dissertation.

Clearly, the "size" of the question one is willing to ask will determine the outcome of such endeavors. In this regard, I have used my intuitions and understanding of the purpose of life as the major criterion in the choice of a conceptual perspective for this investigation. For the purposes of this introductory comment, there are two important levels of this perspective which require comment. First, as the material of the dissertation demonstrates, the basis of any approach toward life and science is to be found in the individual's deeply held convictions about the final realities of existence. For my part, as a member of the Bahá'í Faith, this means that I see the current quest for knowledge and understanding as an expression of the ever-advancing civilization of mankind which has found its primary direction in the centuries-long tradition of revealed religion.

Man's advancement within the character of each major epoch of civilization follows a fundamental orientation which has been set by the prophet-founder. Whether we have reference to the prophets of antiquity or more familiar prophets such as Moses, Jesus Christ or Muhammad, the advent of their message has signalized the beginning of a great new phase in the development of humanity. In this age, with the advent of the prophet Bahá'u'lláh, man has once again been re-awakened to the true nature of his spiritual destiny and the realities of his material existence. Thus, the most important determinant of the "size" of the question I am willing to consider comes from the conviction that we are living in a new era which offers an opportunity for change and development which is unrivaled in its potentialities for reform in the standards by which man conducts the affairs of his life and shapes the character of his destiny. Within this global framework, the creation and conduct of scientific inquiry can be understood as a circumscribed but particularly important and useful effort to transform the reality of belief into the reality of explicit knowledge.

This brings us to the next level of importance in the perspective which is used in the dissertation. Since man has created science he can, and periodically does, change the major assumptions upon which it rests. One of the most comprehensive attempts to change the basic assumptions of science in a direction which I believe is also harmonious with the demands of the modern age is the organic process philosophy of Alfred North Whitehead. Thus, the interpretation of historical psychology and the efforts toward re-establishing the conceptual framework of theoretical psychology which are found here derive primarily from Whitehead's analysis of issues in basic science and his formulation of alternatives to the perceived limitations of traditional science.

The assertion that the way toward improvement in psychological theory and educational practice rests upon a more inclusive insight into the nature of reality, a reality which ultimately derives from the animating spirit of an age, carries with it the companion assertion that some of the most important aspects of the new view will not be contained in the old approach. To achieve greater relevance in psychology and education, we must step beyond the consideration of problems which arise within the era of modern science and ask a larger question of the era itself.

This is not to suggest that the topics and issues which belong to this discussion are either totally new or unfamiliar in light of traditional thought. On the contrary, while we may admit that the new explanatory principles must come from outside the standard abstractions of the scientific system of things, we should also demand that the new view must shed light on the same problems which have been the major perplexities of modern times. This is however, a non-trivial problem. To achieve our goal we must balance the uniqueness of the alternative with the givenness of the traditional in such a fashion that the very issues of the old view upon which we desire to shed light will not also so completely determine our outlook that we can only see the possibility of reformed ideas through the apparent gaps in the pattern of the old fabric of ideas.

The truth of the matter is that in attempting to reach beyond the limitations of the old system, we have no other recourse to the basic data of existence than did those who created the original approach to modern science. While we may intellectually struggle to insure that the finest insights and techniques which have arisen from within the system of traditional science should also find profitable exemplification in any future systems, we must also realize that the background of our intellectual struggle is both the deep personal commitment of the individual and the coloration of thought which is provided by the history of our era. Again, in this aspect of our task we are no different than those who have preceeded us.

This issue can be approached from two main directions. Chapter One asserts that it was the faith in the possibility of a science which derived from the traditions of revealed religion that provided the assurance that scientific disclosure of the laws of nature was possible. Again, in Chapter Five the same issue is broached but this time from within the context of latter-day science which has more completely recognized the role of this background of thought as it applies to the behavior of the individual scientist. But there is an important difference between the two interpretations that we must not ignore in this context. In the first case we have the recognition that the background of thought provides a programmatic character which determines what is considered to be the "valid" science of the era, and in the second case, we have the recognition that an individual scientist, in order to proceed with the production of any scientific data, also requires the guidance of deeply held convictions about the true character of the phenomena he is seeking to understand. Clearly, the ideal condition for the development of science is one in which there is a basic harmony between these two aspects of the scientific enterprise.

As the era of modern science began, the twin functions of this background of belief went quite unnoticed because of the basic harmony which existed between the background of conviction and the foreground intellectual understanding. It is as if the direction of an individual's thoughts were influenced in much the same fashion as the direction of a compass needle is influenced by the meridian like action of invisible, yet pervasive, magnetic fields. It is to the main polarization of the era that the individual contributes the polarization of his own being with the expectation that the interaction of the two forces will produce a directed movement toward the ultimate ends sought by the system and the individual.

By extension, we can say that the directional orientation of the belief structure is the least ambiguous when the individuals who are interacting with it are farthest away from the basic character of the ideas which polarize the over-all orientation of the structure. In these cases the true directions to scientific certitude form a rather obvious and clearly marked trail about which there is little fundamental disagreement and by virtue of which a certain type of scientific interpretation is carried into many uncharted regions. It happens however that the path of scientific progress also brings the seeking individual closer to the basic polarities of belief. The predictable result is that there is a pronounced reduction in the orienting power of the polar idea. Just as the terrestrial explorer finds the guidance properties of his magnetic compass reduced to the point that all directions seem equally probable when he has attained greatest proximity to the polarities of the globe, the conceptual explorer will also find that interaction of his beliefs with those of his times will be the most ambiguous at that point in time when he has drawn closest to the full assimilation of the explanatory capacity of that system.

In the system of scientific explanation whose development is a function of the cosmology of the modern era, it has become increasingly clear that the orienting power of the basic ideas of the system is greatest when the questions which are asked are farthest away from the character of human phenomena. As the level and power of scientific explanation has grown and man has sought greater scientific understanding of himself, it has became increasingly evident that our system of scientific beliefs is too much a product of the nature of man's earlier and more limited understanding of himself and his world. As we have drawn closer to the subjective character of those beliefs, their ability to provide the direction and to establish the values toward which science should aim has diminished practically to the same level of equiprobability that characterizes the spinning needle of a magnetic compass that has found its true home in the heart of the polarity which had been its faithful guide.

The task which faces us today and which has been placed upon our scientific horizon by the collapse of materialistic metaphysics is to once again develop an understanding of the cosmos into which we can imbed the polarity of our own beliefs without also drawing so close to the limitations of that view that its directive power is significantly reduced in the process.

In a manner suggestive of the terrestrial explorer who is imbedded in the magnetic perplexity of a polar polarity, we too must turn for guidance to a different realm in order that a truer direction can once again be established. Our explorer friend can gaze into the heavens and pick a star upon which to base his beliefs in the true direction he should follow. Our heavens consist of a more complete understanding of man's freedom and destiny; a truer understanding of the processes of life which by their progressive development of ever novel forms of being, have acted out a drama that demonstrates an increasing ability to seek its meaning in that which is beyond and transcendent to itself.

It should be emphasized however, that the intent of this study has not been to produce a work in either metaphysics or philosophy. It is motivated purely by a concern for the development of a conception of education that will begin to meet the urgent needs of our times. Should the reader be dismayed in the fact that most of the discussions tend toward the abstract, that the topics and pages are many and that there seems to be no immediate bridge between the products of discussion and the pressing needs of educators, I can only add that while I sympathize with those feelings, moving beyond the comforting familiarity of tradition to examine the basis of our approach toward the understanding of man and his world require many steps and suggests a magnitude of effort which lies well beyond the limitations of a doctoral dissertation, to say nothing of the abilities which a single author can bring to bear on the topic. For me, this has been a first, large, step toward seeking disclosure within a new framework of ideas as opposed to the stultifying closure of much contemporary theory in psychology and education. Clearly, such steps are relative to the taker; however, the important thing is that they be taken, since, a dissertation is, after all, part of the process of one's own education.

CHAPTER ONE

1.0 CHALLENGE OF THE MODERN TIMES IN HISTORICAL PERSPECTIVE

While the ways to describe our modern frame of mind are many it is most important for the purposes of this presentation and its relation to education to seek out the roots of our scientific and cultural tradition that are most closely associated with the scientific and academic points-of-view which characterize our present understanding in the human sciences.

It is probably true that each age has its own pressing problems that tax its ability to cope with its environment. That there is also a predominant framework for its approaches to these problems seems a truism. In our age, we have come to rely primarily on solutions which are relevant to the immediate situation at hand because the framework of our scientific and academic approaches to problems is primarily anti-systematic and anti-metaphysical. We pride ourselves that these characteristics also insure that we will be anti-dogmatic in our approaches and therefore tend to forget that a major function of our intellectual traditions is to be prescriptive of long-range goals and directions and not simply descriptive of experimental immediacy. When viewed in a larger sense, we must recognize that our efforts are simply the latest phase in the ages long tradition of man's desire to find some congruity between the vitalities of the evolving cosmos and the heartbeat of the human search for fulfillment.

In this light, we have a dual responsibility in our efforts toward the solution of problems in general and human problems in particular. One is to apply, as we generally do, the best materials and knowledge available to us as we seek the betterment of conditions and the other is to realize that the apparent relevance of the solution at hand is also imbedded in the context of a tradition which not only represents the highest form of life we know but which is also the basis of the astounding realization which has dawned with the coming of the modern age--that man has the power to determine the direction and destiny of life on earth.

The history of the development of Western man's cosmology since the Middle Ages is characterized by the development of two important movements, both of which have their roots in the biblical tradition and the cosmology of the ancient world. At some point in the ancient past, before the development of the virulence of the modern mind, man must have had a fairly complete, if immature, understanding of himself and his world; however, as the twin developments of modern science and philosophy grew in importance and reliance on their explanation of worldly and human matters became more commonplace, man came to the scientific understanding of himself as a contingent being in a purposeless cosmos and gradually assumed a philosophical outlook which increasingly asserted the autonomy of human reason.

Alexander Koyré characterizes the scientific revolution of the sixteenth and seventeenth centuries which has spawned the present "crisis of European consciousness," a statement which applies equally to all Western nations, as a time

> . . . which changed the very framework and patterns of our thinking and of which modern science and modern philosophy are, at the same time, the root and the fruit.[1]

These two trends cannot be divorced from their common heritage in the mentality of the Middle Ages and the basis of that mentality in the ancient past. Koyré has also characterized the changes in the structural patterns of knowledge between the old and the new world-view as reducable to two fundamental and closely connected actions that brought the "destruction of the cosmos" and the "geometrization of space." The combined effect of these factors destroyed the ancient's view of the world as a finite, well-ordered whole whose spatial structure was determined by a hierarchy of perfection and value. This was accomplished by the process of "geometrizing" space which resulted in the picture of an infinite universe, now free of the natural

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[1]Alexander Koyré, From the Closed World to the Infinite Universe (Baltimore: The Johns Hopkins Press, 1957), p. vii.

subordination to value of the older view and possessing a new form of unity obtained by virtue of the identity of its ultimate and basic components and laws. Aristotle's space which consisted of a differentiated set of inner worldly places had become the Euclidian space of infinite and homogeneous extension.

The spiritual basis of life inherent in the Middle Ages was pushed aside by the development of modern science and philosophy. Both of these trends not only threatened but, in fact, have replaced the function previously performed by the tradition of revealed religion. However, to hold this view is, I believe, to ignore a major operating dynamic in the whole character of modern thought. It is my conviction that the type of transcendent knowledge which has historically been derived from the tradition of revealed religion is not only an important source for understanding human experience but is also one which cannot be replaced by a substitute. As we shall see in greater detail in what is to follow, many authors (Butterfield,[2] Whitehead,[3] Jaki,[4]

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[2] Herbert Butterfield, The Origins of Modern Science, 1300-1800 (London: G. E. Bell and Sons, 1967), pp. 7-28.

[3] Alfred North Whitehead, Science and the Modern World (New York: The MacMillan Co., The Free Press, 1967), pp. 1-20.

[4] Stanley L. Jaki, The Relevance of Physics (Chicago: The University of Chicago Press, 1966), pp. 412-440.

Gilkey[5]) have pointed out that the character of the thought in the Middle Ages with its firm grounding in the Biblical vision of God and the world, generated habits of thought which were particularly suited to the rise of empirical inquiry.

Alfred North Whitehead sums his understanding of the impetus behind the use of modern science as follows:

> My explanation is that the faith in the possibility of science, generated antecedently to the development of modern scientific theory, is an unconscious derivative from medieval theology.[6]

To state that theme in another and slightly extended way, this presentation will follow from the assertion that the evolutionary cosmos which we have come to know in our scientific understanding requires, for its intelligibility, a cosmology of hierarchical process grounded in transcendent purpose and that the personal fulfillment we have come to seek in philosophical quests is to be found in a more complete understanding of the spiritual generality of man's nature. Whitehead, again states the issue poignantly

> The faith in the order of nature which has made possible the growth of science is a particular example of a deeper faith. This faith cannot be justified by any inductive generalization. It springs from direct inspection of the nature of things as disclosed

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[5]Langdon Gilkey, Master of Heaven and Earth (Garden City, N. Y.: Doubleday, 1959), pp. 109-139.

[6]Whitehead, Science and the Modern World, p. 13.

> in our own immediate present experience. <u>There is no parting from our own shadow.</u> To experience this faith is to know that in being ourselves we are more than ourselves: . . . to know that while the harmony of logic lies upon the universe as an iron band necessity, the aesthetic harmony stands before it as a living ideal moulding the general flux in its broken progress towards finer, subtler issues.[7]

Having asserted that the source of our science and philosophy is a deeper faith, something which transcends them both, we are in a better position to judge their status as shadows of the larger reality. The intimate connection of these issues and their affectionate articulation with larger issues of faith is seen in the fact that all three of these issues were often represented in the same early scientists, e.g., men like Kepler, Newton, Descartes and Leibnitz. Thus, it is important to underline the fact that the growth and development of modern science and philosophy also signalized a very basic change in man's cosmological view. Seen in this light the threads of science and philosophy are intimately tied together and interwoven into the fabric of modern life and form by their mutual interaction a main aspect of the pattern of life for any given age.

This then, is the challenge presented by the rise of modern science. It is the challenge to reconcile the destruction of the cosmos of the ancients which resulted from

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[7] <u>Ibid</u>., p. 18, emphasis added.

the disappearance of philosophically and scientifically valid concepts of the world as a finite, closed, hierarchical whole

> . . . a whole in which the hierarchy of value determines the hierarchy of structure of being, rising from the dark, heavy and imperfect earth to the higher and higher perfection of stars and heavenly spheres.[8]

with their modern replacements which have disregarded views based on concepts such as value, perfection and purpose in favor the ideas of

> . . . an indefinite an infinite universe which is bound together by the identity of its fundamental components and laws, and in which all these components are placed on the same level of being.[9]

The combined effect of this divorce of the world of value from the world of fact has been to generate a world-view in which man has become a homeless and contingent being in a purposeless cosmos, a product of random variation and natural selection with nothing but himself to rely on for meaning and survival.

This is not an assertion that no one has or can find meaning in the modern world. It is an attempt to say, via an analysis of some major characteristics of science and philosophy, that the meaning which we do find in current

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[8] Koyré, From the Closed World to the Infinite Universe, p. 2.

[9] Ibid., p. 2.

scientific and philosophical thought about personality and education is limited by the nature of the cosmological framework into which we are attempting to place our finest and most complete insights which we derive "from direct inspection of the nature of things as disclosed in our own immediate present experience." It also involves the assertion that however dim and fragmentary this experience may be it is our only clue to the harmony of the ultimate things in nature and is therefore the best way to validate the worth of our scientific and philosophical thoughts about personality and education.

To our centuries long tradition of faith in reason and faith in science we must now add faith in man and his transcendent destiny. We must recognize that education in the art of being requires self-knowledge of the process of becoming.

1.1 THE ROOTS OF MODERN SCIENCE AND PHILOSOPHY

As indicated earlier, many scholars who have investigated the rise of modern science have focused upon the importance of the ferment in the Middle Ages which was generated out of the increasing impact of modes of thought separately derived from the Judaeo-Christian biblical tradition and Aristotelian natural philosophy.

Of prime importance to an understanding of the nature of these changes is the difference in the doctrines of law and order which pertained between the two views. Aristotle and the Greek tradition saw nature primarily as an organism in which laws were based upon internal relations and were therefore immanent in nature. This point-of-view led them to focus upon the formal element in things and was responsible for their efforts to discover the purposive form which was efficacious in giving actual form to the material world. Matter was seen as simply the vehicle of the eternal form. By contrast, the point-of-view which ultimately led to the creation of modern science and which was derived from Judaeo-Christian beliefs, tended to emphasize, in its stress on the law in nature as imposed by the Will of God, a machine-like view of nature based on external relations. This view saw God as the creator of both the material and formal aspects of the world. Since it was the case that God created all things, their existence had to be accepted as a reality. Therefore, it was a natural step to the outcome that since everything individual had an existence derived from God, it also had a real self-existence and could therefore act as an independent body capable of causal interaction with other independent and self-subsistent bodies. Whereas the Greeks had seen matter as resistant to form and therefore incapable of exact mathematical expression, the Judaeo-Christian view was that since all matter was created by the omnipotent Will of God it also strictly obeyed the

Laws of God.[10]

In this way, the doctrine of creation functions in the dual role of providing a way of understanding the physical world and the assurance that the investigation will result in the establishment of laws that can be expressed with the precision of mathematical statement. Gilkey[11] summarizes the assumptions of modern science which evolve directly out of the long biblical tradition as represented in the Christian thought of the Middle Ages as three in number, each following directly from the vision of the relationship of the Creator to his creation. First, a created universe requires that the perfection of God be manifested in his creation and that that perfection would amount to an order in nature that could be discovered. Second, since the order is expressed in the happenings of nature, the place to seek an understanding of it is in nature itself; therefore, knowledge of reality is to be obtained through empirical study. Third, the focus upon the material aspect as opposed to the formal aspect of things further emphasizes the trend toward quantitative examination and mathematical expression of God's perfection as manifested in nature.

That the foundation of modern science was closely

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[10]C. G. von Weizsacker, The Relevance of Science (New York: Harper and Row, 1964), pp. 162-164.

[11]Gilkey, Maker of Heaven and Earth, p. 115.

aligned with the biblical tradition seems clear enough; however, in our times we also recognize that the biblical basis for the role of a transcendent creator has dropped out of the picture of modern science. Thus, elements which were central to the character of modern science in the thinking of its sixteenth and seventeenth century creators are now regarded as antiquated doctrines of the dim past. We easily feel that science is our only guide to the truth and that scientific truth is our only reliable source of insight into that which is really real. However, it is not equally obvious that in dropping the biblical tradition from the explicit basis of justification for scientific inquiry, we have elevated the status of present scientific methodology to that of metaphysics.

In the past, Newton, for example, believed as his student and editor Roger Coats tells us in the introduction to the second edition of the <u>Principia</u>:

> The business of true philosophy is to derive the natures of things from causes truly existent, and to inquire after those laws on which the Great Creator actually chose to found the most beautiful Frame of the World, not those by which he might have done the same, had he so pleased.[12]

Similarly, the great Leibnitz, though differing sharply on the proper role to be ascribed to the place and function of

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[12] Isaac Newton, <u>Mathematical Principles of Natural Philosophy</u>, p. 85. <u>Ibid</u>., p. 12.

God, felt that:

> Sir Isaac Newton and his followers, have a very odd opinion concerning the work of God. According to their doctrine, God Almighty wants to wind up his watch from time to time: otherwise it would cease to move. He had not, it seems, sufficient foresight to make it a perpetual motion. . . . According to my opinion, the _same_ force and vigour [_sic_] remains always in the world, and only passes from one part of matter to another, agreeably to the laws of nature, and the beautiful pre-established order.[13]

Stanley Jaki, in his penetrating analysis of the relation between physical and theological thought, holds that this mechanistic world-view of a clockwork cosmos had the important effect of clearing away the impediments of past views which had assigned "intelligences" to the heavenly spheres.[14] Though this was a blow to astrology it did pave the way for a more mature understanding of the physical universe. Once the Aristotelian view that it was desire and love in the heavenly bodies that produced their physical motion as an imitation of the "Prime Mover whose life was an everchanging spiritual act"[15] had been dispelled, it was then necessary to assume that the movement of the heavenly bodies was the result of the motion imparted to them at the time of creation.

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[13] Gottfried Wilhem Leibnitz, quoted in A. Koyré, _From the Closed World to the Infinite Universe_, p. 236.

[14] Jaki, _The Relevance of Physics_, pp. 412-440.

[15] _Ibid._, p. 414.

It is Jaki's opinion that:

> . . . had it not been for the Christian idea of creation, it would have easily led to a wholesale doubting whether the world was really rational in all its parts. Granting the supreme rationality of a personal Creator, as conceived in the Christian context, his handiwork too had to be supremely rational. Such a view furthermore was not merely a hesitating play with premises and conclusions, . . . [16]

He concludes this thought by quoting with approval Whitehead's cogent summary of the situation as being the result of far more than a "hesitating play" but rather, the issue of an "unquestioned faith of centuries" and "an instinctive tone of thought" which created,

> . . . an inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner, exemplifying general principles.[17]

Jaki drives the point home by citing the results of Joseph Needham's study of the history of scientific development in pre-revolutionary China. Needham, who he claims was "no particular friend of Theology" was only able to explain the Chinese failure to build a systematic science, while at the same time demonstrating great technological proficiency and inventiveness, as the result of the fact that the Chinese traditions did not include a faith in a supremely rational

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[16] Ibid., p. 418, emphasis added.

[17] Whitehead, Science and the Modern World, p. 12, quoted in Jaki, Ibid., p. 419.

and personal creator. Needham continues:

> there was no conviction that rational personal beings would be able to spell out in their lesser earthly languages the divine code of laws which he (the Creator) had decreed foretime.[18]

Thus, modern science can stress its view that the cosmos is a vast, self-contained system only by replacing the assurances which early scientists had derived from the nature of God's participation with the idea that the scientific method and its philosophical justification are as dignified and potent bringers of order and understanding to the world as had been the God of the "ancients." In this way, science has come to see its true nature as the nontheological search for and explanation of the nonpurposive natural forces which animate the material world. Once again, we find Whitehead ready with penetrating insight and suggestive metaphor; he states:

> The soil, the climate, the seeds were there, and the forest grew. Science has never shaken off the impress of its origin in the historical revolt of the Later Renaissance. It has remained predominantly an anti-rationalistic movement, based upon a naive faith. What reasoning it has wanted, has been borrowed from mathematics which is a surviving relic of Greek rationalism. . . . Science repudiates philosophy. In other words, it has never cared to justify its faith or to explain its

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[18] Joseph Needham, Science and Civilization in China, II, History of Scientific Thought (Cambridge: Cambridge University Press, 1956), p. 581, quoted in Jaki, Ibid., p. 419.

> meanings; and has remained blandly indifferent to its refutation by Hume.[19]

1.2 THE SCIENTISTS AND THEIR THOUGHT: SELECTED EXAMPLES

The best way to characterize the changes in perspective which attend the rise of modern science and their relation to the educational and psychological problems of today is to appreciate the historical development of the newer view as it is manifested in the lives of the key figures in the transition. Accordingly, the following treatment of limited examples of selected seventeenth century founders of modern science, i.e., Copernicus, Galileo, Descartes, Newton, and Locke, attempts to capture the flavor of the individual's thought and to pinpoint the development of those theoretical constructs which have proven to be of lasting interest and crucial importance in modern times.

1.2.1 NICHOLAS COPERNICUS (1473-1543)

Copernicus, who is widely recognized as one of the central figures of the new scientific revolution, was actually not very far removed from the basic traditions of the past. For example, he felt that,

> It is fitting for us to follow the methods of the ancients and to hold fast to their observations which have been handed down like a Testament. And to him who thinks that they are not to be entirely trusted in this respect, the gates of our science are certainly closed.

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[19] Whitehead, Science and the Modern World, p. 16.

> . . . he will get what he deserves for believing that he can lend support to his own hallucinations by slandering the ancients.[20]

Arthur Koestler points out that Copernicus' real motive originated in a desire to remove a minor blemish from the Ptolemaic system of astronomy; but instead,

> He was led to reversing the Ptolemaic system by his desire to preserve it--like the maniac who, pained by the mole on his beloved's cheek, cut off her head to restore her perfection.[21]

The very feature in the change which Copernicus ushered in was his combined use of mathematical reasoning and experimental observation. Mathematics played an important role because the algebraic formulations which Copernicus had at his disposal were a much more powerful tool than the geometric methods available to Ptolemy. The geometric foundation of the older system, which make astronomy appear as a branch of geometry, simply did not have the descriptive power of the new algebraic expressions and Copernicus found great delight in being able to assimilate the older scheme with its cumbersome and arbitrary explanations into his view that the movements of the planets and earth around the sun created a much more elegant mathematical description of the deserved data.

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[20]Nicholas Copernicus, quoted in Arthur Koestler, The Sleepwalkers (New York: Grosset and Dunlap, 1963), p. 200.

[21]Ibid., p. 203.

The importance and depth of this shift in cosmological emphasis can be shown in two ways. First, as E. A. Burtt indicates

> The question went pretty deep, it meant not only, is the astronomical realm fundamentally geometrical, which almost anyone would grant, but is the universe as a whole, including our earth, fundamentally mathematical in structure?[22]

and second, in the words of Alexander Koyré,

> . . . it seems to be psychologically quite normal that the man who took the first step, that of arresting the motion of the sphere of fixed stars, hesitated before taking the second, that of dissolving it in boundless space; it was enough for one man to move the earth and to enlarge the world so as to make it immeasurable . . . ; to ask him to make it infinite is obviously asking too much.[23]

Thus the revolution which sometimes bears his name is seen to require more than Copernicus' enjoyment of mathematical elegance and conservative tendencies. It also required the outright assertion that the cosmos is infinite, a statement that Copernicus was unwilling to make. The distinction of adding this most characteristic and important element to the new world view is given by A. O. Lovejoy to Giordano Bruno.

> Though the elements of the new cosmography had, then, found earlier expression in

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[22] Edwin A. Burtt, The Metaphysical Foundations of Modern Physical Science (London: Routledge and Kegan, 1932), p. 52.

[23] Koyré, *op. cit.*, p. 34.

> several quarters, it is Giordano Bruno who must be regarded as the principal representative of the doctrine of the decentralized, infinite and indefinitely populous universe; for he not only preached it throughout western Europe with the fervor of an evangelist, but also first gave a thorough statement of the grounds on which it was to gain acceptance from the general public.[24]

These changes and many more like them are indicative of the process which was bringing in the idea of quantitative relationships as a replacement for the qualitative thought of the earlier times. The universe increasingly became a place that had a mathematical structure as opposed to a place that had a purposeful structure with natural places for things like fire (up) and earth (down) and where the rain fell to water the crops.

1.2.2 GALILEO (1564-1642)

This new attitude which found one of its early and complete formulations in the mind Galileo is described by Whitehead as follows:

> This new tinge to modern minds is a vehement and passionate interest in the relation of general principles to irreducible and stubborn facts. All over the world and at all times there have been practical men absorbed in "irreducible stubborn facts"; all over the world and at all times there have been men of philosophical temperament who have been absorbed in the weaving of general principles. It is the union of passionate interest in the detailed facts with equal

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[24]Arthur O. Lovejoy, The Great Chain of Being (Cambridge: Harvard University Press, 1936), p. 116.

> devotion to abstract generalization which forms the novelty.[25]

Ian Barbour pinpoints this new "novelty" of detailed passion and devoted abstraction in the behavior of Galileo by demonstrating the unique combination of abstract generalization "thought-experiments" and interest in detailed facts which characterized Galileo's approach. He sights Galileo's description of his experiments with the inclined plane as a "classic example of the combination of induction and deduction, reasoning back and forth between theory and experiment."[26] In these experiments, Galileo made great use of concepts like length, time, and velocity which were amenable to mathematical expression. He tried many theoretical assumptions, calculated the predicted experimental results and made tests to verify his findings. Barbour asserts that in this is to be found all the characteristics of the new science.

> <u>the distinctive type of concept, the combination of theory and experiment, and the goal of expressing laws of nature as mathematical relationships among measurable variables</u>.[27]

It is important to note that the creation and use of a method which explicitly formulated the use of both inductive

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[25]Whitehead, <u>Science and the Modern World</u>, p. 3, quoted in Ian G. Barbour, <u>Issues in Science and Religion</u> (Englewood Cliffs, New Jersey: Prentice Hall, 1966), p. 24.

[26]<u>Ibid</u>., p. 25.

[27]Ibid., p. 25, Barbour's emphasis.

and deductive procedures also opened the possibility of separating the two and concluding, as Bacon, Hume and the modern positivists have done, that science simply consists of the collection and classification of observations. Such simplistic definitions of empiricism leave out the theoretical or abstract side of science and therefore fail to capture the role of the creative imagination of the scientist.

To make the character of Galileo's contribution more explicit it is necessary to contrast the results of his approach to that of the Aristotelian background he was reacting against. To see this point clearly is to understand why "Galileo keeps harping on how things happen, whereas his adversaries had a complete story as to why things happen."[28]

Aristotle was also keen on observation, but failed to add the incisive theoretical clarity to his observations that characterized Galileo's approach. When Galileo observed motion, for example, he departed from the naive unexamined immediacy characterizing Aristotle's approach by the addition of abstract concepts which could not be exemplified in their own right but only in the behavior of things. He saw motion as the interaction of the continuing inertial motion of the body and a frictional retarding

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[28]Whitehead, Science and the Modern World, p. 8, emphasis added.

force. Aristotle had observed that things left to themselves would stop, Galileo explained the theoretical basis of the phenomena. He handled his analysis of pendular motion in the same way. Whereas the ancients had focused upon the stone's final state of rest at the center of its swing (its lowest, therefore natural, position) Galileo, ignoring the incidental properties, saw the pendulum's swing in a new light and explained how the motion of the pendulum is naturally damped by the friction of the air.

It is obvious from this that Galileo found no need to concern himself with the purposes of objects when he could not only adequately explain how they were moving, but also had an apparently general system which applied to all bodies in motion. In this way, the character of man's examination at his world became fundamentally different than it had been in the past. Aristotle believed that if one did not know the cause of something he was merely stating an opinion and did not possess knowledge of the event. Accordingly, he had conceived of four types of causes, ranging from the lowest or "material" cause through the successive stages of "formal" cause, "efficient" cause and "final" cause which were all required in order to fully explain the why of nature. Now, we see that scientific interest came to ignore the final cause which was directed at the future and also the formal cause which was seen to be of the essence of the object itself in favor of explanation in terms of efficient causes which act on the material (material cause) to produce the observed phenomena. This state of affairs is also a good indicator of the "shrinkage" of the world-view which was occurring with the rise of science: all-embracing metaphysical systems, based primarily upon the naive issue of unexamined sense perception, were being replaced by abstract descriptions of limited phenomena.

While we owe a great debt to Galileo's creative genius in firmly establishing the methods of science, we are also deeply involved in the modern version of some of the products of the content of his thought. Galileo's quantitative states of motion led him to assume that the matter, whose motion he was observing, was ultimately constructed of indefinitely small indivisible atoms. In this assumption he is simply forming an up-dated version of the atomism of the ancient Greeks by adding the rigor of modern scientific expression to the purely philosophical and speculative accounts which are to be found in the words of Democritus. In what must be one of the clearest and longest standing anticipations of subsequent developments, Democritus in the fifth century B.C. maintained that:

> By convention sweet is sweet, by convention bitter is bitter, by convention cold is cold, by convention hot is hot, by convention color is color. But in reality there are the atoms and the void. That is, the objects of sense are supposed to be real, and it is customary

> to regard them as such, but in reality they are not. <u>Only the atoms and the void are real</u>.[29]

Burtt observes that while the precise historical parents of Galileo's atomism are unknown, it is probably true that,

> Galilean atomism and its mechanical corollaries were due to the percolation through the intervening ages of some fragmentary ideas from the great Greek materialist. . . . Certainly the doctrine of primary and secondary qualities, with causality lodged in the atoms . . . , exhibits strong marks of a Democritanism brought up to date and fitted into the new mathematical programme [<u>sic</u>].[30]

In coming to this phase of Galilean thought we are on the threshold of one of the most significant developments of the whole modern era. This development is none other than the formulation of the seventeenth century version of "corpuscular philosophy." This philosophy, which was more than the atomism of ancients and less than the atomic theory of the nineteenth century, should be seen as one of the most fundamental characteristics of the modern era. For it was by virtue of this view that birth was given to two very important trends; namely, the twin children of the modern age, science and philosophy. This is not to say that there were no antecedents of this view or that all credit and or blame

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[29]Democritus, quoted in A. Wheelis, <u>The End of the Modern Age</u> (New York: Basic Books, 1971), p. 32, emphasis added.

[30]Burtt, <u>Metaphysical Foundations of Modern Physical Science</u>, pp. 77-78.

should be given to Galileo; for, whatever our historical preferences may be and however we may wish to add up the fragmentary ideas which "percolated through the ages," the fact remains that in the thought of Galileo we have the first major metaphysical step in the banishment of man from the world of nature and the subsequent creation of the metaphysical and epistemological problems which have characterized the entire modern age.

Focusing first on the human implication of this view and recalling our earlier discussion of the character of most ancient and medieval thought, we are reminded that the natural tendency was to see both man and nature as important parts of the whole cosmos. Plato, and his student Aristotle, always had man in a fundamental position in the value of things and never regarded him as in any way associated with the poorer half of any dichotomy between primary and secondary or being and nonbeing. Man was seen as the microcosmic exemplification of the splendors of the macrocosm. The elaboration of the doctrine of primary and secondary qualities marks the beginning of man's spectator status in the universe. Burtt asserts that:

> <u>Now, in the course of translating this distinction of primary and secondary into terms suited to the new mathematical interpretation of Nature, we have the first stage in the reading of man quite out of the real and primary realm</u>.[31]

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[31] <u>Ibid</u>., p. 79, author's emphasis.

He goes on to elaborate with the observation that man himself is a poor subject for the mathematical study required by the developing science since those qualities seemingly most characteristic of man e.g., his life of colors, sounds, hopes, pleasures, passionate loves and intense agonies belong only to man and are not to be found in the world of resting and moving material objects. Hence, the assumption that the real world was outside of man and that contrary to the ancient tradition, especially Plato and Aristotle, which saw a higher reality in Ideas and Forms which man is able to contemplate in the full reality of his immediate experience, in the light of all his faculties, the new view now classed as secondary just those very features which had seemed most important. For man, now conceived as an assemblage of secondary qualities, the only hope was to rely upon that aspect of his nature which could alone provide knowledge--his theoretical and mathematical mind.

Turning now to the scientific impact of this view, we see that Galileo arrived at his form of "corpuscular philosophy" as a result of his willingness to generalize the categories he found useful in describing the phenomena of matter in motion he observed with the naked eye. Galileo's thought focuses upon the categories of mass, space and time not only because they could be treated mathematically but also because they fitted the scheme of atomism which was constrained to see the world as composed of particles which were totally described in terms of their mass and velocity. Now that the formal and final causes had been shown away from the basic system, it was no longer possible to meaningly view change as the transition of potentiality to actuality; on this view, one was constrained to see only the efficient and material causes as represented in the rearrangement of material particles (material cause) in accord with the mathematically describable laws of motion (efficient cause). This said, we can best conclude this summary of Galileo's scientific thought by briefly looking at the basic meaning it had for the issues of primary and secondary qualities and the phenomenon of time. Both of these issues are of immanent importance to the psychological and educational topics that are to follow.

First, Galileo called the qualities of mass and velocity primary because he viewed them as belonging only to the external world and therefore independent of the observer. His criterion in this choice was to focus the "permanence" of the qualities in question and to assign secondary status to anything that was "added" to nature by the subjective reaction of the individual and his sensory modalities. It is important to observe that Galileo also held an implicit criterion for this choice; namely, the ability to choose phenomena that were amenable to quantitative mathematical description. Galileo, in terms reminiscent of his ancient predecessor Democritus, is very explicit about the matter:

> But that external bodies, to excite in us these tastes, these odours [sic] and these sounds demand other than size, figure, number, and slow or rapid motion, I do not believe; and I judge that, if the ears, the tongue, and the nostrils were taken away, the figure, the numbers, and the motions would indeed remain, but not the odours nor the tastes nor the sounds, which without the living animal, I do not believe are anything else than names, just as tickling is precisely nothing but a name if the armpit and the nasal membrane be removed; . . . [32]

As an indication of the ultimate fate of the scientific aspects of this formulation of the primary qualities of mass and velocity it is important to jump into the twentieth century for the insight that modern relativity theory exactly contradicts this position in its assertion that these qualities of mass and velocity are not independent of but relative to the observer.

Turning now to the impact this new philosophy had on the meaning of time, we find another important assumption which still serves to color our modern thinking. Aristotle, and the medieval thinkers who followed his thought, saw temporal processes as the continuous transformation of potentiality into actuality--both relying heavily on the mystical experience of mortal man in his role as the highest

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[32]Galileo, quoted in Ibid., p. 78.

of the hierarchy of formed matter. God was seen as the eternal and self-sufficient power which drew out of creation all that is potentially capable of being actualized. "To put this in modern terms," Burtt writes, "the present exists unmoved and continually draws into itself the future";[33] the apparent absurdity of that statement must be viewed in light of the fact that as the modern inheritors of Galileo's thought, we too, have banished man from the real world and have no place for time as something lived but only for time as an abstract category represented by a measurable continuum--a hypothetical construct in which the present is simply a timeless dividing time between past and future. Seen in this light, the true nature of time is one of the greatest unsolved philosophical puzzles of the modern era and has, of course, been a primary topic in the work of many important modern philosophers, e.g., Bergson, James and Whitehead.

We will meet the issues of primary and secondary qualities, and the other metaphysical and epistemological problems inherent in this in these foundations of the modern era many times in what is to follow; in the present context it is most relevant to remark that both the developing conceptualization of a mechanical world and the belief in God were reconciled within the founding fathers' philosophy.

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[33]Ibid., p. 85.

Galileo, for example, held that since sensory observations derive from nature and as God is the author of nature then there should be no conflict between the two sources of knowledge.

> I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages but from sense-experiences and necessary demonstrations, for the holy Bible and the phenomena of nature proceed alike from the divine Word. . . . For that reason it appears that nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called into question (much less condemned) upon the testimony of biblical passages which may have some different meaning beneath their words. For the Bible is not chained in every expression to conditions as strict as those which govern all physical effects; nor is God anyless excellently revealed in Nature's actions than in the sacred statements of the Bible.[34]

In taking this view, Galileo is however, marking an important shift in the biblical frame of reference. Whereas the centuries long tradition had viewed an understanding of nature as subordinate to the revealed theology of the Bible, Galileo's asserting that knowledge of nature and knowledge of scripture should be placed on the same level and given equal status in the approach toward God. But the equal status was to be short-lived for it was all too easy to focus greater and greater importance upon the "clear and distinct" products of the new science whenever there was

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[34] Galileo, quoted in Barbour, Issues in Science and Religion, p. 30.

uncertainty about the vague connotations of the scripture. We find this interpretation in many of the important thinkers of that time, for example, Kepler wrote:

> As the ear is made to perceive sound, and the eye to perceive color, so the mind has been formed to understand, not all sorts of things, but qualities. It perceives any given thing more clearly in proportion as that thing is close to bare quantities as to its origin, but the further a thing recedes from quantities the more darkness and error inhere in it.[35]

Closeness to bare quantities and clear and distinct sensory information become the hallmarks of the new science; Galileo's own words are an appropriate indication of the legacy he left,

> Philosophy is written in this great book, the Universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and to read the letters of which it is composed. It is written in the language of mathematics and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a simple word of it; without these one wanders around in a dark labyrinth.[36]

1.2.3 RENE DESCARTES (1596-1650)

For the final touches on the development of the character of scientific thought in the seventeenth century, it is to René Descartes that we must turn for the philosophical

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[35] Johannes Kepler, quoted in L. Mumford, The Myth of the Machine (New York: Harcourt, Brace, Jovanovitch, 1970), p. 140.

[36] Galileo, quoted in Ibid., p. 140.

justifications of the new model of man. In Descartes we find the full development of the philosophical and psychological implications of those doctrines which have been "percolating through the ages." Descartes, as we have seen, decidedly did not create the famous mind-body dualism; instead, he functioned to bring to critical focus and explicit statement, those centuries long traditions which formed the foundations of his age.

Dualism in the Middle Ages, following the lead of Aristotle, was preoccupied with the idea that the body was rather like a container into which the soul was placed at conception--there to remain until the moment of death. In some ways Descartes' criticism of his predecessors is similar to that which much modern psychology and education has of its immediate antecedents, including the traditions which are founded upon Descartes' thought. That is to say, a main part of his motivation is to be found in his dissatisfaction with the extant view which made the relation between mind and body appear rather like a puppet and puppeteer. Descartes insisted.

> It is not sufficient that the soul be lodged in the human body like a pilot in his ship, unless perhaps for the movement of its members. . . . It needs to be joined and united with it more closely, in order that, in addition to any such motor-function, it may

> have sensations and appetites and thus constitute a true man.[37]

Seen in this light, Descartes' efforts are more appropriately viewed as an attempt to unify the mind and the body rather than to sunder the relationship as is often supposed.

Given that Descartes is a product of the seventeenth century, it is natural that his philosophy should reflect the increasing influence of those views which asserted the autonomy of the mind and its ability to discover the nature of the Creator via the rational and mathematical study of the character of creation. This new outlook found expression in a desire to make the scientific and philosophical view of the causal relationship between the soul and body not only explicit but also, and most importantly, mutual. This coloration of Descartes' thought by that of his age is to be seen in the important factors which entered into his philosophy. First, was his firm conviction (which he obtained when visited by an "Angel of the Lord" in a dream) that mathematics was the way to knowledge; everything, he felt, would ultimately be reduced to a geometrical description--a second important factor in his system. For Descartes all non-geometrical properties had to be taken from

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[37]René Descartes, in N. K. Smith, ed. and trans., Descartes' Philosophical Writings (London: MacMillan, 1952), p. 149, quoted in Richard Lowry, The Evolution of Psychological Theory (New York: Aldine-Atherton, 1971), p. 6.

the world and located in the mind, whose nature as a non-extended thinking substance, made it not only totally separate from matter but also of such unique character that there was no comparison between the machine-like qualities of extended space and the unextended thinking spirits.

Part of the reason for the radical dualism he established is to be found in his rejection of the medieval doctrine of the tripartite "nutritive," "sensitive" and "rational" souls. Descartes in a manner suggestive of the contemporary rejection of "formal" and "final" causes retained only the doctrine of rational soul and saw it as responsible for all thought processes. The other phenomena, i.e., life functions and sense perceptions, formerly ascribed to the nutritive and sensitive souls, were now simply an inherent function of the body itself--and bodies, it will be remembered, are totally determined by the immutable laws of nature which act upon extended matter in space. That Descartes explicitly inverts the teleological structure of past ages is shown in this rejection of the medieval position that the vitality of the body is dependent upon the nutritive and sensitive souls. This error he felt:

> . . . arises from the fact that from observing that all dead bodies are devoid of heat and consequently of movement, it has been thought that it was the absence of the soul which caused these movements and this heat to cease; and thus, without any reason, it was thought that our natural heat and all the movements of the body depend upon the soul: while in

> fact we ought on the contrary to believe that the soul quits us on death only because this heat ceases, and the organs which serve to move the body disintegrate.[38]

From this basic position, many important consequences follow. For example, all living bodies including man's are now "automata," self-moving machines, only the rational soul distinguishes man's existence from the rest. To accomplish the interaction between mind (soul) and body he required, Descartes elaborated a "psychophysiological" theory which related many current doctrines of the times into a "coherent" scheme. From anatomy he borrowed the central importance of the brain as a directive center as opposed to the heart or liver; from the current technology came the hydraulic analogy responsible for nerve-hydraulics which gave meaning to animal-spirits moving from the brain to operate the muscles. Obviously, Descartes was building upon centuries of tradition in formulating this view; he synthesized, but he also hypothesized and in so doing added a new dimension to modern thought.

In responding to his conviction that "the soul be lodged in the body" in a closer fashion so that it would form the basis for "sensations and appetites and thus constitute a true man," Descartes laid the groundwork for the conceptualization of reflex mechanisms. His mental

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[38] Descartes, quoted in Ibid., p. 8.

hydraulics led, quite naturally, to an understanding of the possibility that excitation at a sense organ could be mediated by the brain and therefore, communicated to a muscle. Of course, his whole system requires just such a view. Automata must be so constructed as to be self-sufficient in the sense that a stimulus elicits a response in virtue of the interconnections within the system. The problems which flow naturally from the formulation are all too familiar to modern psychological theory. Though the term "reflex" did not arise for another century, Descartes, many of his contemporaries and an embarrassing number of moderns were all involved in the tasks of sorting out why some stimuli create specific responses and why some create varied responses by way of attempting to justify a purely machine-like model of an automatic human body. Descartes failed and modern psychology is beginning to wonder.

We, for reasons similar to the original objections Descartes raised about his predecessors, are finding that the psychophysical dualism he fostered, though long abandoned in an explicit sense, is still with us and leaves too little room for the expression of those qualities which "constitute a true man."

1.2.4 RENE DESCARTES AND JOHN B. WATSON

In earlier sections we dwelt at length upon the shrinkage of world-view that has characterized the rise of modern science and the attendant diminution of the position of man in the cosmos; here too, we can pause for another statement of this theme. This time however, we can be more specific both in example and in relevance to modern times.

"Possibly the best way to bring out the contrast between the old psychology and the new," wrote John B. Watson in 1924

> is to say that all schools of psychology except that of behaviorism claim that "consciousness" is the subject matter of psychology. Behaviorism, on the contrary, holds that the subject matter of human psychology is the behavior or activities of the human being. Behaviorism claims that "consciousness" is neither a definable nor a usable concept; that it is merely another word for the "soul" of more ancient times. The old psychology is thus dominated by a kind of subtle religious philosophy.[39]

Here, Watson rejects the "soul" which Descartes found necessary and concentrates instead upon behavior. His view of the nervous system, though he could make use of modern electrical knowledge in forming a metaphor and also by then had benefit of a rather fully elaborated reflex theory, bears a striking similarity to that of Descartes.

> When a stimulus arises in a receptor . . . the stimulus is carried off along preformed and definite arcs to the effectors in the order in which the arcs offer the least resistance to the passage of the current.

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[39]John B. Watson, Behaviorism (New York: Norton, 1924), p. 3.

> . . . But there is no formation of new pathways.[40]

Thus, Watson retains the machine-like physical body of man and rejects the "soul" as the result of the domination of a "kind of subtle religious philosophy." What seemed subtle to Watson was a central factor to Descartes; for far from being an incidental characteristic, religious philosophy was central to Descartes' formulation. For Descartes, it was only possible to explain the interaction of the mind with the body by including the two in a larger more meaningful framework. That is, he explained that a) the extended physical body can give rise to sensations in the unextended mental substance and b) the unextended mind can have valid conceptualizations of the external world because God had made the world of matter in such a fashion that the purely mathematical concepts which were intuited by the mind were perfectly applicable to it. Descartes' system required for its complete meaning, a metaphysical wedding between the world of extended matter in space and the world of unextended thinking spirits--a wedding performed upon the altar of God. By the time of Watson, psychology was no longer vexed by the problems of wondering about the "true" relation of such widely divergent entities and was unconcerned with whether or not our scientific picture is a true copy of the real

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[40] Watson, Behavior: An Introduction to Comparative Psychology (New York: Holt, 1914), pp. 16-17.

extended world or if, in fact, it was simply a convenient ordering of our unextended experiencing mind. It makes one wish that Watson had taken the time to be more explicit about his vision of the fulfillment he foresaw for individuals in the behaviorist scheme when he expressed the sentiment that:

> I wish I had the time to describe this, to picture to you the kind of rich and wonderful individual we should make of every healthy child if only we could let it shape itself properly and then provide for it a universe in which it could exercise that organization--a universe . . . free of foolish customs and conventions which have no significance in themselves, yet which hem the individual like taut steel bands. . . . For the universe will change if you bring up your children not in the freedom of the libertine, but in behavioristic freedom--a freedom which we cannot even picture in words, so little we know of it.[41]

Perhaps Watson would never admit to a vision from God which was purveyed by "an Angel of the Lord" in a dream, yet the scope of his thought seems hardly more circumscribed; for he not only thought in universal terms but also sought to "change" the universe by "controlling" behavior. One way or another, it would seem, man needs both a vision of what "constitutes a true man" (the human potentialities which lie before him), and also a method to reach his goal; for, sooner or later, and even if the explicit principles of the science forbid it, man's desire to control his fate

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[41]Watson, Behaviorism, pp. 247-248.

in relation to nonmaterial ends always manifests itself. In some very important ways, Descartes was simply more honest than Watson, though it is doubtful that Watson was intentionally dishonest since his limited materialistic metaphysics simply did not allow the formulation of larger questions.

Whatever the problems which existed in the forefront of the minds of those in the seventeenth century may have been and however we wish to describe them today, it is important to note the tremendous contrasts which have arisen between the Galileo-Descartes world-view, which itself was a tremendous departure from that of the medieval tradition, and the view of a large portion of modern psychologists.

In concluding an earlier section we asserted, that the rise of modern science and philosophy, has had the combined effect of divorcing the world of value from the world of fact--primary and secondary qualities are an expression of that cleavage. We also asserted that the collapse of the hierarchical teleology of the Middle Ages into the infinite and indefinite universe in which all components and laws were placed on the same level of being amounted to the creation of a world-view in which man became a homeless and contingent being in a purposeless cosmos, a product of random variation and natural selection with nothing but himself to rely on for meaning and survival--we see Watson's psychology as an expression of that existential crisis. It is an expression of the spirit of man made homeless by its progressive banishment at the hands of theory, experiment and mathematical laws--the shiny surface of our pure knowledge has become such a small facet of total being that it can no longer reflect an adequate image of man. Watson attempted, but was "unable to part from his own shadow." His formulation of a method by which one could rely on oneself for meaning and survival in the face of materialistic response determinism is to be seen in the light of those "larger" aspects of being which, while not recognized by the theory, are, nonetheless, the stimuli for the type of response toward a "universe unshackled" that characterized the background of Watson's thought.

We must now begin to move more rapidly through the historical channels that lead to modern psychological thought. We have dwelt at length upon many issues of a larger or cosmological nature in order to provide the type of perspective that will form a useful contrast in later chapters when various alternatives to modern interpretations are explored. The intent of the remainder of the historical material of the seventeenth, eighteenth and nineteenth centuries is to show: a) its relation to the roots already presented and b) the continued and progressive narrowing of the scope of phenomena considered meaningful for psychology.

Two seventeenth century thinkers of importance to the present context remain to be considered: one scientist and one philosopher.

1.2.5 ISAAC NEWTON (1642-1727)

Isaac Newton, it is often remarked, was born in the same year that Galileo died, 1642; thus the two men represent, within their span of two generations, the formulation of the basic doctrine of modern science. Newton's inventive genius is widely known and his contributions of the calculus and system of physical laws are, in many ways, the capstones of the innovations of his great predecessor Galileo.

In terms of general scientific thought, Newton held firmly to the principle that the scientist's role was to describe and not to speculate, to create literal representations of the "laws on which the Great Creator actually chose to found the Frame of the World." Newton clearly saw the world as a law abiding machine in which the laws of motion and gravity were seen to apply to the smallest particle and the farthest planet. The laws of the "Great Creator" were the source of ordered forces on masses as opposed to a hierarchy of purposes. This view contains the perfect justification that the world is completely predictable and it is easy to see how Newton's belief in the existence of an intelligent Creator could eventually be dropped out in favor of a purely self-contained mechanical system that had no room for human meaning and purpose.

Since Newton's scheme epitomizes the concentration upon qualities that are treatable in quantitative ways it naturally came to treat mass and velocity as the basic terms of description. In this way Newton's considerable weight and authority in matters scientific and philosophical was thrown squarely behind that of Galileo and final causes were totally replaced by efficient causes; causality became viewed as simply the action of forces between atoms and all change was seen as totally explainable in terms of the rearrangements of atoms.

1.2.6 JOHN LOCKE (1632-1704)

John Locke is an important philosopher in that he wrote with a knowledge of Newtonian physics and therefore elaborated a doctrine which was completely in keeping with the status of physical science in the late seventeenth century. When he wrote his famous Essay Concerning Human Understanding in 1690, Locke elaborated a theory of psychological mechanism in which the basic elements were "ideas" that behaved in ways very similar to Newton's "particles."

Of central concern to Locke in his treatment of ideas as analogues of atoms was to establish how it was that these ultimate particles came about. For many reasons Locke found it necessary and advisable to restrict the origination of ideas strictly to the results of experience, he held that the mind was a "void of all characters, without any ideas" until written upon by experience. "Let is suppose the mind to be, as we say, white paper, void of all characters, without any ideas," Lock wrote as he posed the question of how it might be that, " . . . it becomes furnished?" and "Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an endless variety? Whence has it all the materials of reason and knowledge?" To these questions Locke had one answer, a total and complete description of reality that left no remainder. In framing that answer Locke created the first real expression of a psychological empiricism when he responded to his rhetorical questions with, "To this I answer, in one word, from experience. In that all our knowledge is founded and from that it ultimately derives itself. Our observation employed either, about external sensible objects or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understanding with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have do spring."[42]

Psychological empiricism then, is really a psychology in which the basic units "ideas" form the atomic texture

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[42]John Locke, An Essay Concerning Human Understanding, ed. by A. C. Fraser (Oxford: Clarendon, 1894), quoted in Lowry, Evolution of Psychological Theory, p. 19.

of mind. Locke elaborated this psychology by keying his mechanistic mental description directly into physical theory. He held that there were two kinds of ideas "simple" and "complex." Simple ideas, he believed were those which were derived directly from experience with the primary qualities in nature and complex ideas were his way of maintaining a strict empiricist position upon the derivation of ideas, i.e., from experience, while at the same time being able to explain how other ideas which did not derive from experience came about. Since some ideas, for example the concept of infinity, were obviously not derived from direct experience of primary qualities Locke held that they resulted from the compounding of simple ideas which were experienced directly.

In providing for the compounding of simple ideas, Locke used the term association of ideas and thereby created the "psychology of association" as a description of how ideas became connected with one another. Since Locke's times were still greatly reliant upon the order of nature as created by God and the mind's ability to know that order directly as we have seen in Descartes and Newton in particular, Locke did not find it necessary to elaborate in great detail on why some ideas allied with others. He just assumed that the order was inherent in nature; wrong ideas therefore, were simply those associated by chance ordering rather than nature's ordering.

Thus, Locke became the founding father of a psychology which was explicitly based upon the new cosmology of modern science and one which also opened up the way for many subsequent "developments" in psychological theory--many of his successors were to struggle with issues relating to the formation of complex ideas, i.e., how they happen and what accounts for the naturalness of some connections and the unnaturalness of others.

1.3 THE WHITEHEADIAN FALLACY OF MISPLACED CONCRETENESS AND ITS RELATION TO THE SEVENTEENTH CENTURY

Before closing this summary of the seventeenth century it is well to consider some of the issues which, though they belong to this time, were not obvious to the people involved and only result from our modern interpretation of their thought. A major interpretation of these times that will be useful in later discussions is that of Whitehead.

Whitehead locates many of his central criticisms of traditional science here in the seventeenth century.[43] Central among these criticisms is what he calls the "Fallacy of Misplaced Concreteness." This fallacy has three major presumptive components, each of which was firmly established in this epoch. First, there is the assumption of

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[43] Whitehead, Science and the Modern World, pp. 39-55.

"simple-location" which is the view that matter or material can be completely described by the property of being simply located in space and time. This assumption, Whitehead asserts, is a useful abstraction but one which totally inhibits the recognition that entities and processes do not exist in isolation from one another and do, in fact, require an explanation which involves other regions of space and time. We will meet this assumption again in the next century when we consider how Whitehead can assert that modern science "has remained blandly indifferent to its refutation by Hume." Another important presumption of the over-all fallacy are the closely related categories of substance and quality. Whitehead's main point here is that any analysis of nature is based upon abstract concepts which are simplifications of experience. He further points out that we should always question just how "concrete" our thinking is when it is based upon the "concrete" categories we are using as the basis of our logical system. The substance-quality problem arises from the character of that age which believed in the absolute independence and reality, therefore concreteness, of the indestructable particles of matter which were the building blocks of nature. Thus, objects were observed to have various qualities, some of which we predicated as belonging to the substance itself (primary qualities) and others were accidental (secondary); that is, added to the primary spatio-temporal relationships that constitute the real world. The third element is not quite as visible from what has been said as the other two have been. This is Whitehead's "Doctrine of Mere Sensation" in which he summarizes the tenor of empiricist thought by pointing out that the early thinkers had assumed that the primary activity in an act of experience is simply the bare subjective entertainment of the datum. Under this assumption they were happy in the concrete assurance that the data of experience were true and not distorted by any subjective form of reception.

From these examples and in conjunction with the previous material we see that misplaced concreteness is not the result of an explicit decision to believe certain facts within the framework of the knowledge and understanding of an age but is, rather, a statement of the perpetual blind-spot in the foveal vision of each age. When it comes to comparing ultimate points-of-view, science cannot be objective enough to weigh and measure the subjective parts of its own existence.

Certainly the creative geniuses of the seventeenth century would have been surprised indeed by Whitehead's colorful summary of the practical outcome of their scientific philosophy. In characterizing the enormous success of age, based as it was on the concepts of matter simply located in space and time and mind as the perceiving and reasoning but not interfering substance, he concluded that:

> Thus nature gets credit which should in truth be reserved for ourselves: the rose for its scent: the nightingale for its song: and the sun for its radiance. The poets are entirely mistaken. They should address their lyrics to themselves, and should turn them into odes of self-congratulation on the excellency of the human mind. Nature is a dull affair, soundless, scentless, colourless; merely the hurrying of material, endlessly, meaninglessly.[44]

1.4 SUMMARY AND CONCLUSIONS

The proper conclusion of this chapter is a summary of the main descriptive points which are central to the over-all theme of this presentation. In outline form and not necessarily in order of greatest importance, the following points have been elaborated and to some extent justified.

First--we have witnessed the displacement of man from the center of the cosmos and the gradual demise of his perceived importance to that system.

Second--has been the increased emphasis placed upon the power of reason as the basis for man's dignity.

Third--is the all important rise of modern science with its shift of emphasis from purposive explanations to experimentation and theory in the language of mathematics. Mathematical description of "efficient" causes replaced teleological emphasis on "final" causes.

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[44] Ibid., p. 54.

Fourth--Divine purposes in nature were increasingly replaced by explanations of the mechanico-mathematical type. We moderns see that the seventeenth century reaction to a prior age which was dominated by religious thought has created the modern age which is dominated by scientific thought and are increasingly coming to seek a balance between the two types of explanation.

Fifth--we have seen that the mechanistic world-view, which was part of the larger cosmology of the seventeenth century, and which was originally closely associated with the methods of science has become the modern metaphysics. At some point scientific conclusions are also philosophical interpretations which tend to survive even when the specific fact is modified. Subsequent chapters will touch upon the "truth" of materialism, determinism, and atheism which find their "roots" in this age and which acted to dissolve man into a solution of natural facts subject to mechanical law.

Sixth--The great success of physical thought carried over into psychological thought with the result that only mathematically describable elements of experience could be classed as primary qualities of the external world. This view of nature was largely static because material configurations were predictable by law so that no fundamentally new novelty was seen as possible.

Seventh--in terms of the specific psychological issues, we have seen the creation of the explicit mind-body dualism and the beginnings of the long-standing problems of how to deal with the two abstract entities. We saw Descartes establish the closely allied doctrine that the body has a primary vitality of its own which is responsible for the theory of automata and ultimately leads to Behaviorism. In John Locke we found the elaboration of total psychological empiricism; ideational atomism with complex ideas formed by association of simple ideas, and the translation of the physical doctrine of primary and secondary qualities into psychological reality.

The amount of space which has been devoted to the seventeenth century is, perhaps, large in relation to the remainder of the material that must be covered. Yet, it is only the barest sample of the volumes that have been written and the material which could have been presented which also would have been relevant to the topic at hand. Perhaps the importance of the issues arising in this, the earliest century of scientific development, is best underscored by Whitehead's terse comment to the effect that the tremendous success of the major assumptions of this age has "foisted onto philosophy the task of accepting them as the most concrete rendering of facts. Thereby, modern philosophy has been ruined."[45]

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[45] Ibid., p. 55.

CHAPTER TWO

2.0 THE EIGHTEENTH CENTURY: AN ENLIGHTENED AGE

In assessing the eighteenth century and its further impact upon the development of modern thought we are immediately confronted by the great difference between it and its predecessor, the century which Whitehead referred to as the "century of genius"; and of which he was willing to say,

> A brief, and sufficiently accurate, description of the intellectual life of the European races during the succeeding two centuries and a quarter of our own times is that they have been living upon the accumulated capital of ideas provided for them by the genius of the seventeenth century.[46]

The eighteenth century, like its immediate successors, was a time in which the influence of the ideas of modern science spread into many and diverse areas of human activity. There were further developments in the physical sciences; biology was founded in the pioneering work of Linnaeus and zoology was launched by Buffon. It was an age of transition in which the major characteristics of the modern cosmology: its sharp distinction between the categories of mind and material, were gradually elaborated into a view of nature which was deterministic and reductionistic. It was an age which purchased its optimistic view of man's perfectability through reason at the expense of shifting from concepts involving the role of God, to the assumption of skeptical,

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[46]Whitehead, <u>Science and the Modern World</u>, p. 39.

atheistic philosophies which venerated material scientific progress.

Before discussing the specific events which are most relevant to the content of current psychological and educational theory, it is important to catch some flavor of the over-all context of the times which spawned these specifics.

The eighteenth century, also known as the Age of Reason, was one which venerated, above all else, the Newtonian paradigm of scientific discovery as the pattern upon which the acquisition of all knowledge should be based. While Newton had firmly established the principles of satisfactory scientific explanation, there was apt to be a great deviation from his findings in the outcome of the application of those principles. This is clearly shown in the work and thought of Laplace, who, one hundred years after Newton, put the final touches on the creation of the infinite universe of modern man. Newton had believed that the clocklike world would run down if it were not for the energetic God who ran the world according to His free-will and decision. Even in his own time Newton was opposed by Leibnitz who was concerned to show that the world mechanism was self-sufficient and neither required nor admitted the intervention of God--though He was still seen as its Creator. However, in the time of Laplace some of the phenomena which, to Newton, were signs of God's hand in nature were reduced to mathematical formulation, i.e., scientific explanation. For example, Newton had seen in the irregularities of planetary orbits the requirement for God to interact; otherwise, the imperfections might grow to unmanageable proportions. Laplace, on the other hand, achieved a mathematical analysis of these phenomena which related the questionable behavior to the mutual attraction of the planets. Such empirical success, combined as it was with an equally deterministic theory of the origin of the solar system (his nebular hypothesis) which apparently explained the original ordering without the need of referring to God, is reported to have prompted Laplace to respond to Napoléon's question about why the role of God was missing in Laplace's volume System of the World in which he had explained creation--"I had no need of that hypothesis."[47]

This is a simple example of the widely used assertion that belief in God must be exclusively located in a gap in the scientific account of nature. A scientist with a faith in God and also a faith in the advance of scientific inquiry found it increasingly difficult to reconcile the two views, and Laplace seemed to heighten the discrepancy to its limits by the forthright assertion of strict determinism.

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[47]Pierre Simon Laplace, quoted in Koyré, Closed World to Infinite Universe, p. 276.

> We ought then to regard the present state of the universe as the effect of its anterior state and as the cause of the one which is to follow. Given for one instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it--an intelligence sufficiently vast to submit these data to analysis--it would embrace in the same foundation the movements of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present to its eyes.[48]

In addition to the determinism expressed in the above quotation is the associated view that "the same foundation of movements" applies to all bodies in the universe. In other words, all phenomena are seen as yielding to an ultimate explanation in terms of physical laws. This form of reductionism has two main components. First of all it relates to Laplace's epistemology in that it contains the assertion that knowledge is knowledge of physical laws and second, there is a relation to Laplace's metaphysics which holds that reality is actually a composition of matter in motion. We will meet this assumption again in the near future in connection with the psychological theorizing of La Mettrie. Here however, it is useful to note the importance of these two notions for the belief that causality is shown by the impact of one particle upon another. These views require that cause and effect should be explained in terms of

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[48]Laplace, <u>A Philosophical Essay on Probabilities</u> (New York: Dover, 1961), p. iv.

mechanical forces between two moving bodies--a view soon to be exploded by Hume.

Along with the epistemological and metaphysical changes relating to the new scientific doctrine there was a primary effect upon the conception of God and His place and function in the lives of people. This transition has been traced by Barbour[49] and is formulated in three overlapping stages. In the first stage, the earliest part of the century, broad based support was to be found for traditional revealed religion and also for rational religion which was seen as an equally efficacious route to the same basic truths. In the second stage of development, rational religion gained prominence and scriptural relevance was diminished in authority. In this view, the Benevolent Father in Heaven became simply the Progenitor of the world-machine, the Cosmic designer of a world left to run on its own. Finally, in the third stage of transition, people became increasingly dissatisfied with such a do-nothing God who was so irrelevant to everyday life and were inclined to view the church as an enemy of progress and freedom.

Combined with this reaction to the established tradition was the development of an increasingly positive appraisal of the station of man and the power of his reason. Out of this trend grew the accolade, The Enlightenment, as

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[49]Barbour, Issues in Science and Religion, pp. 60-62.

a description of the new intellectual climate which saw the power of reason as the key to man's problems in all areas of life--science, religion and human affairs. The concept of social law seemed a natural extension of the successes obtained in discovering physical laws and their discovery was seen as the key to the well-being of society and man. What was wanting, was a Newton-like bringer of the knowledge and understanding by which society could be regulated. It was an age of implacable optimism in which freedom of expression and opposition to dogmatism were important values in the translation of the centuries long religious view of man's salvation into a view which sought human perfection in man's unaided efforts to build a society on earth which would be the modern version of the ancients' "City of God."[50]

2.1 THE ROMANTIC MOVEMENT: A PLEA FOR INTERNAL REALITY

If it is true that the seventeenth century had produced a world which was seen as the result of the mechanism of God and the mechanism of matter, it is also true that the scientific scheme has outlived the religious scheme. In the demise of that second great portion of its all too limited metaphysics, modern science has lost the ability to

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[50]Charles L. Becker, The Heavenly City of the Eighteenth Century Philosophers (New Haven: Yale University Press, 1932), Chapter 4.

give theoretical expression to man's most inward and concrete thoughts. While competent engineering seemed to be a complete replacement for religious teleology to some, the age was not unanimous in its rejection of aspects of experience which did not fit within the neat schemes of scientific thoughts. Accordingly, a movement known as the romantic reaction achieved visible status by the middle of the eighteenth century.

There are two aspects of this movement which are most relevant to our concerns. First, in the minds of those involved in the movement there was the feeling, and ultimately the assertion in poetic form, of the awareness that the beauty of nature held a deeper spiritual reality which linked all things together. In the poets' intuition is found a greater apprehension of the reality of personal experience and the beauty of nature than can be found in the cold categories of abstract science. Therefore, the literature of an age is a good clue to those inward thoughts of a generation which are not expressible in terms of the laws of nature and or the "laws" of society. Second, awareness of the character of the romantic reaction is useful in formulating a criticism of and a response to those limitations we now perceive in that system.

For Whitehead,[51] the topic is of such importance that

[51]Whitehead, Science and the Modern World, Chapter 5.

he devotes an entire chapter to its treatment. It is his endeavor to show that materialistic scientific philosophy is incapable of expressing the fundamental intuition of mankind. Further, he asserts, (and we include this statement as an indicator of things to come rather than an explication of Whitehead's position) " . . . that the whole concept of materialism only applies to very abstract entities, the products of logical discernment"[52] and that there is nothing sacred about these abstractions that renders them irreformable or unalterable. His philosophy of organism is an attempt to bridge the gap between materialistic science and the fundamental intuitions of the poet. For example, he quotes Wordsworth's The Prelude as expressive of the human feeling for nature, with its character of entwined and intermingled entities each suffused with the presence of the others:

> Ye Presences of Nature in the sky
> And on the earth! Ye Visions of the hills!
> And Souls of lonely places! can I think
> A vulgar hope was yours when ye employed
> Such ministry, when ye through many a year
> Haunting me thus among my boyish sports,
> On caves and trees, upon the woods and hills,
> Impressed upon all forms the characters
> Of danger or desire; and this did make
> The surface of the universal earth,
> With triumph and delight, with hope and fear,
> Work like a sea? . . .[53]

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[52] Ibid., p. 79.

[53] William Wordsworth, The Prelude quoted in Whitehead, Science and the Modern World, p. 84.

It is Whitehead's intent to show that the standardized concepts of science are too narrow to contain the expression of the more concrete facts of our apprehension and that in relation to that basic apprehension the view of nature which modern science imposes upon our thoughts is very strange and paradoxical indeed. However one wishes to describe the immanence of God in the world, it seems strange indeed that the apprehensions we know in our finer moments of commerce with experience, undistorted by scientific analysis, bear such little resemblance to the Being early science saw as the external creator of an impersonal machine.

The poet's statement is a statement of divine indwelling, an awareness of the spirit pervading man and nature as known in man's own experience.

Whitehead's criticism of scientific abstractions is an effort to establish a new doctrine which will be consonant with the vivid expression of personal experience and one which will "transfer to the very texture of realization in itself that value which we recognize so readily in terms of human life."[54] However, before seeking the characterization of this replacement view we must first trace the historical foundation in the thought of the major figures who simultaneously created the character of modern science and

[54] Whitehead, Science and the Modern World, p. 93.

the need for an alternative doctrine. Accordingly, we must now move to a discussion of those individuals that form the major landmarks on our historical trek into modern times. This and subsequent treatments will become more narrowly defined in terms of the specific topics of psychology as a science as those topics begin to raise above the general stream of scientific and philosophical thought and assume an independent status. It has been the intent to establish a broad enough view of the cultural milieu at the time of the birth of modern science so that the personality characteristics we will find in the later adolescent and early adult stages of scientific thought will be more intelligible on the one hand and more amenable to alteration on the other.

2.2 PSYCHOLOGY IN THE EIGHTEENTH CENTURY

As one would expect, the psychological thought of the eighteenth century mirrors many characteristics which are contained in the age in general. In overview, we find that the self-endowed accolade The Enlightenment carries the very important connotation of being "enlightened" in relation to "darkness"--the darkness of the Middle Ages, of course. For psychology this means that the new view of man, which developed out of the characteristics of seventeenth century thought, contains several basic implications of the over-all paradigm shift that had taken place. For example, the shift from "the closed world to an infinite universe" and its attendant portrayal of man as a contingent being in a purposeless cosmos created the basis for psychology to view man not as a divine performer in a cosmic drama but as an animal, the most evolved animal, but none-the-less an animal in a mechanical universe. Similarly the new metaphysics had no room for the soul as a first principle in the structure of reality; further, it didn't simply ignore the concept it abhored it, with the result that psychology found itself predisposed to eschew the ancient concept of innate ideas in favor of a thoroughgoing empiricism. Within this over-all framework, we can now treat the development of some specific psychological issues as they occurred in the thought of the age.

The first point of note about eighteenth century psychology is that two quite distinct trends are seen to evolve out of the thought of its prime seventeenth century ancestors; René Descartes on the one hand and John Locke on the other. Descartes, it will be remembered, was heavily involved in conceptualizations which utilized physiological models of mental processes while Locke, being thoroughly imbued with the new Newtonian metaphysics, was content with creating a miniature mental cosmos in which all the primary factors in the operation of his mental mechanism were direct translations from the new metaphysics and epistemology, i.e., matter in motion.

Demonstrating the contrasts between the two views is easiest if the topics are handled separately. Accordingly we will treat Locke's followers first and then the heirs of Descartes. It is also important to observe, at this juncture, that in entering into the construction of psychological theory we are adding another order of magnitude to the abstractive hierarchy of modern psychological knowledge. That is to say, in the seventeenth century the split between mind and matter was firmly established as the first abstractive steps in sundering the relationships between man and the cosmos and of course, ultimately God. Here in the eighteenth century, as we begin the formulation of theories pertaining to the mind, we are building on a basis which assumes the validity of its foundations and abstracts from that abstraction, as it were, a new set of hypotheses which are to help explain the basis from which they are derived. This realization is important to the relevance of Whitehead's comments about the Fallacy of Misplaced Concreteness and the character of the "high abstractions" which are involved in it. Our present concerns here in the eighteenth century are simply the next logical step in the abstractive hierarchy which ultimately leads to the dizzying heights of specialization which characterize the modern sciences.

2.2.1 GEORGE BERKELEY (1685-1753)

In Berkeley we have a figure that is highly representative of the over-all changes that were taking place and the way in which those changes influenced the specific theorizing of the age. Berkeley, Whitehead observes, "launched [a] philosophical criticism against the whole basis of the system."[55] His primary motive in this came from deeply held religious convictions which ran counter to the train of thought which had been developed by Descartes and Locke. Berkeley felt that the problems derived from the supposed existence of matter which made it easy for "impious and profane" persons to deny providence and to attribute "the whole series of events either to blind chance or fatal necessity."[56]

In his criticism of the whole system Berkeley introduced a great variety of arguments, some of which bear directly upon the psychological basis of mental mechanism. Since Berkeley did not believe that the object of scientific cognition was an independent and inert material substance, he found it impossible to accept the distinction between primary and secondary qualities. He wrote:

> They who assert that figure, motion and the rest of the primary or original qualities do

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[55] Ibid., p. 75.

[56] George Berkeley, quoted in W. T. Jones, A History of Western Philosophy (New York: Harcourt, Brace and World, 1952), p. 753.

> exist without the mind, in unthinking substances, do at the same time acknowledge that colours, sounds, heat, cold and suchlike secondary qualities, do not; which they tell us are sensations, existing in the mind alone, that depend on and are occasioned by the different size, texture and motion of the minute particles of matter. . . . Now, if it be certain that those <u>original</u> qualities are inseparably united with the other sensible qualities, and not, even in thought, capable of being abstracted from them, it plainly follows that they exist only in the mind. . . . In short, extension, figure, and motion, abstracted from all other qualities are inconceivable. Where therefore the other sensible qualities are, there must these be also, to wit in the mind and nowhere else.[57]

Clearly, Berkeley's attack on the doctrine of primary and secondary qualities hits at the entire modern movement. Ultimately, his arguments led him to the philosophical position known as subjective idealism since all phenomena were: a) in the mind and nowhere else (subjective) and b) the result of having existence in God's thoughts rather than empirical reality (idealism). Of primary concern here, of course, are the implications of his position for psychology. It is not necessary to explore the explicit character of Berkeley's philosophy.

Berkeley's argument against primary and secondary qualities was extremely effective in its criticism of Descartes and Locke because Berkeley showed that both the vaunted primary and the secondary qualities are "inseparably

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[57]Berkeley, quoted in Jones, <u>A History of Modern Philosophy</u>, p. 754, Berkeley's emphasis.

united" and exist "only in the mind." In taking this position Berkeley is, however, agreeing with Descartes and Locke that sense perception is a subjective affair; he simply equates the two qualities which had earlier been placed on different ontological levels.

This extreme form of subjectivism created the need to explain the apparent existence of the external world of sense objects. To do this, Berkeley relied upon Locke's doctrine that ideas were the basic building blocks of the mind and added the doctrine of contiguity as the means by which the ideas are associated with one another. This formulation led ultimately to Berkeley's famous saying of objects that their "esse est percipi" that is, to be real, a stone for example, required the coexistence of the visual ideas of color, shape, texture, etc. and also the ideas of resistance and pain so that the whole complex would add up to the proper sensation when one's toe came in contact with the stone.

Berkeley extended his views and elaborated them into a theory of vision in which he asserted that the perception of distance is not a pure perception at all but is, on the contrary, simply a construction which relies upon the repeated and contiguous association of the relevant ideas that constitute the perception of depth. Depth perception, he believed, was constructed out of experience with visual impressions (two dimensional retinal images) which were associated with tactile and kinesthetic sensations. In this theoretical account primacy in the determination of depth perception is given to tactile as opposed to visual sensations and creates an issue that will grow to be of great importance in later theoretical contexts.

In sum, we see Berkeley's psychology as continuing, with major modification, the mental mechanist views of Locke and leaving in its wake a more firmly established tradition of mentality as composed of the association of ideas and the operation of contiguous paring. On the philosophical side, we have ignored the traditional account of subjective idealism but must, at this point, pause briefly to explore a topic that will be of importance to the development of Whitehead's alternative to materialism and its uses in psychology.

2.2.2 WHITEHEAD ON BERKELEY AND PREHENSION

Whitehead goes back to those criticisms of the basic system which are found in Berkeley and remarks that Berkeley:

> . . . failed to affect the main stream of scientific thought. It flowed on as if he had never written. Its general success made it impervious to criticism, then and <u>since</u>. The world of science has always remained perfectly satisfied with its particular abstractions. They work, and that is sufficient for it.[58]

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[58] Whitehead, <u>Science and the Modern World</u>, p. 66, emphasis added.

Whitehead's contention is that modern scientific thought (ours included) rests upon assumptions (abstractions) which are too narrow for the concrete facts of our intuitive experience. Berkeley, he believes, is an important clue to that wider basis for scientific thought. It is important to note that, with the development of this topic, we are anchoring a modern philosophical criticism of past philosophical thought in the context in which that past thought originally arose. This departure from historical sequence is important because it can allow some anticipation of the modern Whiteheadian position as we move through the subsequent stages of thought as developed by Berkeley's eighteenth, nineteenth and twentieth century successors.

Whitehead asserts that Berkeley was, in effect, denying the notion of simple location[59] when he said in his <u>Principles of Human Knowledge</u>:

> When we do our utmost to conceive the existence of external bodies, we are all the while contemplating our own ideas. But the mind <u>taking no notice of itself</u>, is deluded to think it can and does conceive bodies existing unthought of or without the mind, though at the same time they are apprehended by or exist in itself. . . . It is very obvious, upon the least inquiry into our thoughts, to know whether it be possible for us to understand what is meant by the <u>absolute existence of sensible objects in themselves, or without the mind</u>. To me it is

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[59]Cf., Chapter 1, Section 1.3, <u>The Whiteheadian Fallacy of Misplaced Concreteness and its Relation to the Seventeenth Century</u>.

> evident those words mark out either a direct contradiction, or else nothing at all. . . .[60]

As we have seen, Berkeley held an extreme idealist position in which the ultimate reality of the mind is structured by the unity of nature as it arises from the unity in the mind of God. Whitehead offers an alternative to this view which he calls a "provisional realism" and by which he proposes to widen the scientific scheme in a way more useful to science than Berkeley's metaphysical tactics. The key to this all important Whiteheadian alternative lies in the nature of one's view of the process of perception. For Whitehead, the traditional topic of perception is a confused issue because the elaboration, through the centuries, of the basic assumptions we have seen develop in the thoughts of Descartes and Locke have clothed the topic with many meanings. Specifically, perception is primarily associated with the idea of cognition or cognitive apprehension. Whitehead is at pains to cut beneath these common usages and to get at the idea of apprehension as devoid of cognition. To accomplish this feat he is forced to add another neologism to the specialized Whiteheadian vocabulary that so often frustrates initial attempts to understand his scheme of ideas. For the notion of uncognitive apprehension Whitehead substitutes the term "prehension" as a means of

[60] Berkeley, quoted in Whitehead, Science and the Modern World, p. 68, Whitehead's emphasis.

providing the:

> . . . vehicle by which one actual entity becomes objectified in another . . . they [prehensions] are "vectors"; for they feel what is <u>there</u> and transform it into what is <u>here</u>.[61]

a more complete definition, but one which requires for its complete understanding, greater explication than is possible in the present context is:

> Every prehension consists of three factors: a) the "subject" which is prehended, namely, the actual entity in which that prehension is a concrete element; b) the "datum" which is prehended; c) the "subjective form" which is how that subject prehends that datum.[62]

Prehension then, is primarily a means by which it is possible to explain the fact that things <u>here</u> in this place where the perceived happens to be can have reference to other places <u>there</u> where the perceiver happens not to be. Berkeley, in the passage quoted above, held that it was a delusion for the mind "to think it can and does conceive bodies existing [<u>there</u>] unthought of or without the mind." In other words, Berkeley asserts the subjectivits position that in order for entities to be real they must be perceived within the unity of the mind and that the mind should not forget itself in the process. For Whitehead, prehension is a substitute for Berkeley's <u>mind</u> and is a process by which

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[61] Whitehead, <u>Process and Reality</u>, p. 133, Whitehead's emphasis.

[62] <u>Ibid</u>., p. 35.

the realization of a perception arises as a result of the

> . . . gathering of things into the unity of a prehension; and that what is thereby realized is the prehension, and not the things. This unity of a prehension defines itself as here and now, and the things so gathered into the grasped unity have essential reference to other places and other times.[63]

Thus, prehension describes a progressive realization of natural occurrences in which the idea of process is a concrete fact and functions in lieu of the "concrete" facts of the old system which had the property of simple location. Process replaces matter and is a main metaphysical assumption of the philosophy of organism. In the process framework, space and time are not the containers into which matter can be placed and therefore simply located; rather, a region of space and time is a simply located unit of realized experience.

The apparent unintelligibility of that last statement should be viewed in light of the fact that Whitehead is developing a parallel line of argument which bases its system of thought upon the concept of organism and not upon the concept of matter. And, for the moment, we must concur with his statement to the effect that a considerable expansion is required as well as a confrontation with the actual implications of the view in terms of concrete experience before the organismic concept of prehension can become

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[63]Whitehead, Science and the Modern World, p. 69.

intelligible.

Surely it is true that "the main stream of scientific thought . . . flowed on as if [Berkeley] had never written" and a different basis of abstraction seems strange indeed. This disparity of views is another example of the type of disparity referred to earlier in connection with the contrast between the idea of time as it appeared to Aristotle and Galileo[64] and suggests that the threshold of cosmological change has again caught the toe of the practical foot of scientific progress.

2.2.3 DAVID HUME (1711-1776)

In David Hume we come to the first important departure from the general trends we have been considering up to this point. Hume, unlike the others, was a man who held no reverence for religious views and saw the appeals to God so characteristic of Berkeley's thought as a form of mysticism. The depth of his conviction is amply demonstrated by the response he gave, while on his death bed, to a question about the after-life. Hume is reported to have responded that:

> It was also possible that a piece of coal when put upon the fire would not burn. [That] men should exist forever [was] a most unreasonable fancy. . . . The trash of every age must then be preserved, and . . . new

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[64]Cf., Chapter 1, Section 1.2.2, <u>Galileo</u>.

universes . . . created to contain such infinite numbers.[65]

A rationalist to the very end like Hume can be expected to create some unusual ripples in the pool of accumulated knowledge and wisdom--such, indeed, was the case.

As Berkeley's successor, he was a mental mechanist who accepted the dissolution of the distinction between primary and secondary qualities and also had great affinity for most of Locke's psychological theory. Hume's most salient general characteristic is, then, aside from the incisive genius with which he is generally credited, his departure from the "constraints" of religious influence and the complete reliance upon the issue of a clear logical intellect as the ultimate source of truth.

Once the covering hypothesis of God had been stripped away, Hume saw, more clearly than his predecessors, that the whole idea of mental mechanism was keyed into the basic idea of association. Unless he could explicitly determine the nature of association Hume saw no hope of establishing a reliable basis for human knowledge.

In his analysis, Hume started from the position that the only place reliable knowledge is to be found is in sense impressions; in this, his epistemological basis for

[65]David Hume, from Private Papers of James Boswell, G. Scott, and F. A. Pottle, eds., quoted in Jones, A History of Western Philosophy, p. 764.

knowledge was not only complete but also quite explicit:

> When we entertain, therefore, any suspicion that a philosophical term is employed without any meaning or idea (as is but too frequent), we need but enquire, from what impression is that supposed idea derived? And if it be impossible to assign any, this will serve to confirm our suspicion. By bringing ideas into so clear a light we may reasonably hope to remove all dispute, which may arise, concerning their nature and reality.[66]

Hume therefore, is wedded to an atomistic view in which the only road to clear and precise knowledge is to refer to the succession of individual sense impressions. Obviously, the relation between these sense impressions must be all-important to a concept of mind which is based upon their storage, rearrangement and comparison.

Up to this point, Hume has essentially been summarizing the earlier empiricist psychologists; however, he goes on to elaborate the necessary relationship between ideas in the mind and sense impressions in finer detail:

> . . . we may divide all the perception of the mind into two classes or species, which are distinguished by their different degrees of force and vivacity. The less forcible and lively are commonly denominated <u>Thoughts</u> or <u>Ideas</u>. The other species want a name in our language, and in most others; I suppose, because it was not requisite for any, but philosophical purposes, to rank them under a general term or appellation. Let us, therefore, use a little freedom, and call them <u>Impressions</u>. . . . By the term <u>impression</u> I mean all our more likely perceptions when

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[66]Hume, <u>An Enquiry Concerning Human Understanding</u>, quoted in Jones, <u>A History of Western Philosophy</u>, p. 767.

> we hear, or see, or feel, or love, or hate or desire, or will. And impressions are distinguished from ideas, which are less lively perceptions, of which we are conscious, when we reflect on any of those sensations or movements above mentioned.[67]

Hume, then, felt he was creating a new category of understanding by developing the concept of impressions--one which "wants a name in our language." An important attribute of this formulation is that it creates an explicit basis in mental mechanism for the assertion that "ideas" and "impressions" stand in a one-to-one relationship and differ from one another only in terms of how lively they are. In other words, ideas are generated by impressions and are the faint copies of which we are aware of when we "reflect."

Another important insight into the specifics necessary to make the mental machine an operable mechanism is found in his assumption that both impressions and ideas, which fit under the general classification of perceptions, can be analyzed into their primitive components.

> There is another division of our perceptions, which it will be convenient to observe, and which extends itself to both our impressions and ideas. This division is into simple and complex. Simple perceptions or impressions and ideas are such as to admit of no distinction or separation. The complex are contrary to these, and may be distinguished into parts. Though a particular color, taste, and smell are qualities all united together in this apple; it is easy to perceive that

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[67] Ibid., p. 766.

> they are not the same, but are at least distinguishable from each other.[68]

Thus, complex ideas are seen to derive from the discrete sensory qualities of the original complex sensation and are the result of recombination in the mind of those elementary sensations according to the laws of association. Hume found it impossible to account for the apparent fact that simple ideas can be associated into complex ideas which are a veridical, if weaker, copy of the original complex sensation without having some sort of universal principle to guide the process. While it was clear to Hume that such a principle was needed, it should also be pointed out that neither Locke or Berkeley had required such a principle because they had direct recourse to a belief in God and the order of his nature. Hume, on the other hand, having cut himself off from that source of order and meaning, holding as he did that it was mostly nonsense, needed some bond between simple ideas which would account for the observed natural affinity of some ideas for other ideas. Accordingly, he posited that:

> There is a kind of attraction, which in the mental world will be found to have as extraordinary effects as in the natural, and to show itself in as many and as varied forms.[69]

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[68] Hume, <u>A Treatise on Human Nature</u>, quoted in R. Lowry, <u>The Evolution of Psychological Theory</u>, p. 28.

[69] <u>Ibid</u>., p. 29.

In this, Hume, due to the influence of Newtonian cosmology in his thinking, can be seen to be seeking the universal he requires as an analog to the universal force of gravity which made Newton's world work. In Hume's mental world the universal was the association of ideas which functioned according to two laws: resemblance and contiguity.

Hume's elaboration of the mental mechanist view of perception (a category in which he placed all mental operations) led him to challenge the traditional view of causality. In the very beginning of the development of modern science Galileo, as we have seen, looked closely into phenomena and observed their behavior in terms of abstract qualities such as velocity and friction. In operating with the quantifyable abstractions which resulted from this analysis, it was a natural step for Galileo and subsequent physical scientists to come to the conclusion that the condition of a physical body at any one moment is the direct result of its condition at a preceding moment. Physical events came to be viewed as necessarily determined by their antecedent events and such "necessary determination" means the same thing as a law--a necessary connection by which the operation of a cause must always lead to an effect.

Cause and effect for Hume, according to his theory of mental operation, was simply the repeated temporal succession of sense impressions in which the only real connection was a psychological expectancy that was gradually built up rather than the operation of any real "law" in nature. The laws of nature thus became the force of habit which is determined according to the principles of association--reality is constructed out of simple ideas. An important implication of this formulation is that science does not observe necessity in the connections of the physical world but only the operation of probable expectation based on previous experience.

Hume's extreme empiricism actually amounted to a refutation of the supposed efficacy of reason which was a major characteristic of his age. In particular, he refuted the explicit foundation of all modern science in his assertion that science instead of being able to demonstrate the reasons why events occur according to the laws of nature, is limited to empirical generalization. Given Hume's view on causality, i.e., habit as opposed to law, it was quite natural for him to assert that the inductive procedures of science amount to nothing more than the observation of past experience. Further, he compounded the problem with the acute observation that no matter how many times event "A" had been followed by event "B," there was absolutely no basis for saying that the same sequence would necessarily pertain in the future, even if one admitted the probabilistic nature of the connection. This condition was true, Hume asserted, because there was no intrinsic reason in the nature of events that made one event necessarily more probable than any other. He considered every datum in the world as loose and discrete and that the process of logical inference was simply a best guess based on past experience (habit). Not only did he show that general laws cannot be derived from particular observations as above, but he also closed the door on the process by demonstrating its circularity.

> We have said that all arguments concerning existence are founded on the relation of cause and effect; that our knowledge of that relation is derived entirely from experience, and that all our experimental conclusions proceed upon the supposition that the future will be conformable to the past. To endeavor, therefore, the proof of this supposition by probable arguments, or arguments regarding existence, must be evidently going in a circle, and taking that for granted, which is the very point in question.[70]

One of the main points upon which we will later criticize Hume's empiricism is his failure to account for the role of the creative human intelligence (self) as the inventor of the concepts by which the data is interpreted. Hume was prevented from realizing such a concept by the narrowness of his premises on the one hand and the rigor of his logic on the other. Since all ideas are not only

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[70]Hume, A Treatise of Human Nature, quoted in Jones, A History of Western Philosophy, p. 768.

derived from impressions but are also only found in the form of simple ideas, they must be compounded by experience into complex ideas. Therefore, Hume was faced with two problems: first, any way of adding up simple ideas is restricted to the production of the complex ideas of things which exist only in the external world and is therefore incapable of generating the complex idea of "self"; second, given the first constraint, Hume is then restricted to finding the source of self in some simple idea. Now simple ideas can only result from simple impressions so he must find a simple impression that will account for self. To this possibility Hume responds:

> . . . from what [simple] impression could this idea be derived? . . . Pain and pleasure, grief and joy, passions and sensations succeed each other, and never exist at the same time. It cannot therefore, be from any of these impressions, or from any other, that the idea of self is derived; and consequently there is <u>no such idea</u>.[71]

Here, we can anticipate our future commentary with a few remarks. First of all, Hume was restricted by his principle of contiguity from reaching beyond the succession of momentary sense impressions and thus exemplifies Whitehead's more general criticism of abstract theories which holds that:

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[71]Hume, <u>A Treatise of Human Nature</u>, quoted in Lowry, <u>The Evolution of Modern Psychology</u>, p. 30, emphasis added.

> The relevance of evidence is dictated by theory. For you cannot prove a theory by evidence which that theory dismisses as irrelevant.[72]

The evidence in question here, is the evidence of experience which Hume ignored in his theory and which later formed the basis for William James' criticism and alternative view:

> . . . the attempt to treat "cause," for conceptual purposes, as a separable link . . . has led to the denial of efficient causation, and to the substitutes for it of the bare descriptive notion of uniform sequence among events [Hume's position]. Meanwhile the concrete perceptual flux, taken just as it comes, offers in our own activity-situations perfectly comprehensible instances of causal agency. The transitive causation in them does not, it is true, stick out as a separate fact for conception to fix upon. Rather does a whole subsequent field grow continuously out of a whole antecedent field because it seems to yield new being of the nature called for, while the feeling of causality-at-work flavors the entire concrete sequence as salt flavors the water in which it is dissolved.[73]

As suggested by James, there is perhaps an entire alternative view of the content of experience which not only makes a place for the self but also does away with the atomistic view of experience in favor of a view which not only recognizes the "concrete perceptual flux" in which "causality-at-work" stresses the contextual character of

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[72] Whitehead, Adventures of Ideas, p. 284.

[73] William James, Some Problems in Philosophy (New York: Longmans, Green, 1911), pp. 217-218.

knowledge but also posits the appreciation of wholes as well as parts and connections between them that are closer to organismic relations than mechanical ones.

David Hume, no doubt, would have found William James' statement quite unpalatable and completely without the savor of the salt of self that flavors the entire concrete sequence in which it is dissolved. Yet, surely, the poet Wordsworth would have appreciated the taste and found in it a place for the entwined and intermingled entities, each suffused with the presence of the others, that he knew in his deeper intuitions. However, in the nearly two hundred years that separate the comments of Hume and James, the mainstream of scientific thought remained truly impervious to changes in course, flowing on instead, in its materialistic channel, while busying itself with the task of wearing a deeper canyon in the territory of abstractions.

2.2.4 THE PHYSIOLOGICAL ALTERNATIVE

The line of development that has been considered so far is, as we have repeatedly asserted, primarily inspired by analogies which derive from the Newtonian physical theory. Mental mechanism, as it was developed by Locke, Berkeley and Hume was always inspired by a basic assumption of the Newtonian metaphysics; namely, that matter can be thought of as having the property of simple location, i.e., the assumption that matter can be completely described by locating it in space and time without reference to any other entity. The mental mechanists did not deviate from this formulation in applying this metaphysical assumption to the description of the phenomena of the human mind. Thus, they unflinchingly and unswervingly analyzed all complex mental phenomena in terms of distinct elementary components. However, the application of metaphysical principles did not necessarily suffice to formulate a complete explanation. In particular, the reference to atomistic sensations failed to capture another very important aspect of that metaphysics, namely, motion. Matter and motion were hand and glove concepts and the use of one without the other created, in some minds, the feeling that something was missing.

In light of this feeling, there were some (those who followed the lead of Descartes) who were less metaphysical and more physical. That is, while the mechanists had never specified just what it was that an "idea" was, and were happy with the metaphysical similarity between the mental and physical worlds; others wanted to pin down the precise nature of what an idea was and to define it in physical terms.

However, the problem was not simply restricted to efforts to do a better job of mental engineering through a more successful application of scientific principles, the question went deeper than that. On the mechanist explanation Hume had finally come to the point of even being skeptical of self and, as we shall see, the efforts on behalf of the physiological explanation are to accomplish much the same goal. At stake here, then, is the original insight of Descartes as to the separation of mind from body. Descartes saw, because of his religious conviction, that the body of man was animated by the same sort of spirit that animated other animal bodies but also, in addition, contained a rational soul that was the directive force for its behavior. He found that he could doubt everything except the fact that he thought; and was able to use this assurance as a validation of the fact that in addition to an animal body, he also had a rational soul that could assert its own existence in "cogito ergo sum." However, much of the certitude of that view comes from Descartes' assumption of two types of matter, one physical and extended, the other mental and unextended. As long as physical and extended matter could be kept in its place, Descartes' position was unassailable; however to those who saw no need to make such a distinction it seemed an obvious move to view thinking as a natural function of the highly complex organization of matter which is found in man.

Such a view was first put forth by Julien de La Mettrie in the middle of the eighteenth century. In 1748

La Mettrie published a volume called Man a Machine which contained the explicit assertion that it was simply the complexity of his organizational structure that separated man from the ape. Thinking was simply the natural function of the brain in just the same way that breathing is to the lungs or secretion to the glands. Lowry remarks that La Mettrie's " . . . concern was to present a programmatic outline for a theory, based upon the concept of complexity of organization, . . . [and] his effect upon the subsequent history of psychological thought must be seen chiefly as a stimulus and as a challenge,"[74] and then goes on to conclude with La Mettrie's closing words to his L'Homme Machine:

> Let us then conclude boldly that man is a machine, and that in the whole universe there is but a simple substance differently modified. . . . Such is my system, or rather the truth, unless I am much deceived. It is short and simple. Dispute it now who will.[75]

2.2.5 DAVID HARTLEY (1705-1757)

La Mettrie's programmatic proposal was also quite consonant with another and contemporary view which was being independently developed by David Hartley in England. Since Hartley was a physician it seems natural that he would lean more toward some sort of "physiologizing" than other followers of the British school of Associationistic philosophers

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[74] Lowry, The Evolution of Psychological Theory, p. 45.

[75] Julien de La Mettrie, L'Homme Machine, quoted in Ibid., p. 45.

whose theories of mental mechanism we have been following. Accordingly, Hartley started from a definition of association which paralleled that of his contemporaries and gave prominence to the idea of contiguity.

> Any sensations A, B, C, etc., by being associated with one another a sufficient number of times, get such a power over the corresponding ideas a, b, c, etc., that anyone of the sensations A, when impressed alone, shall be able to excite in the mind b, c, etc., the ideas of the rest.[76]

Hartley, however, was quick to move well beyond the mental mechanists by postulating the actual physiological basis for the association of ideas. Here again, we see the presence of the Newtonian influence in psychological theory. In this case, Hartley called upon the same type of argument that Newton had used to make an important aspect of his theory intelligible. The problem for Newton was to explain a phenomenon labeled "action at a distance" in a nonmystical way. That is to say, any consistent theory which is based upon a model of a mechanical universe requires some principle to explain the influence of one particle upon the other when there is no obvious contact between them.[77] Newton chose to call his explanatory mechanism aether

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[76]David Hartley, Observations on Man: His Frame, His Duty, His Expectations, quoted in Ibid., p. 46.

[77]An illuminating history of action at a distance is to be found in M. Capek The Philosophical Impact of Contemporary Physics, pp. 83-89.

(ether) which was thought to be a continuous medium of contiguous particles that transmitted forces at a distance by their vibratory motion. Accordingly, Hartley felt perfectly justified in creating a corresponding mechanism for mental phenomena which regarded sensations as the initiators of vibration in the material of the brain.

Of course, Hartley's speculations upon the nature of the physiological mechanism for the association of ideas did not rest upon the results of experimental inquiries; but then, neither did Newton's. What was wanted was a coherent explanation of the facts as given and this is exactly what Hartley found in his "vibratiuncles" (little vibrations). Now that he had a physical concept to work with as opposed to the metaphysical nature of the mechanists' "ideas," Hartley went on to elaborate the explanatory power of his idea. Specifically, he held that each sensation generated a localized vibration in the brain. From this it followed quite naturally that: a) the vibration would die out gradually when the sensation was removed; b) vibrations could and would diffuse in the brain and thus become associated with one another when their sensations were contiguous.

In addition to these concepts, Hartley also developed an explanation of motivation in which the physical action observable as the result of motivation was explained by the "fact" that motory vibratiuncles had become associated with those of ideas so that ideas could then excite the muscles and make them contract. Apparently he did not think to inquire why a shower of ideas was not generated when, for example, someone's arm is pumped up and down without their willing it.

2.2.6 ENLIGHTENED EGALITARIANISM

At the beginning of our consideration of the eighteenth century we pointed out that its character differed significantly from that of its predecessors. We referred to it as an "enlightened" age which professed great optimism about the outcome of its new intellectual adventures in competent engineering as opposed to the old view which found its meaning in religious teleology. We also paused briefly to describe some of the reactions that developed to the narrow efficiency of scientific thought and developed some preliminary discussion of modern criticisms of those early assumptions. Now, in concluding the direct commentary on the eighteenth century, it will be useful to once again take an over-all view of the character of eighteenth century thought but to do so, this time, from the perspective of some of the detailed psychological arguments that have developed during the period.

In earlier discussions we have often referred to the shifted cosmological picture in which man came to see himself as a contingent being in a purposeless cosmos. Here, at the end of the eighteenth century, we see that one of the implications of that over-all shift has been to remove the extreme differences that had existed between the relative status of men and animals. Beginning with Descartes, there was a progressive tendency to equate not only man's animal body with nature but also to explain all his mental attributes and finer sensitivities as simply the result of his complex neural organization. Thus, man was seen as differing only in degree from the animals at a time well before Darwin's great discovery.

Of equal importance was the increased emphasis on theoretical explanations which placed the primacy of all intellectual life upon the ideas generated by experience (Empiricism). While the earliest theorizers, Locke and Descartes for example, had ascribed a definite place to the role of innate ideas which presumably were related to God's nature, the shift to increasingly empirical formulations, as a result of the influence of the success of the Newtonian cosmology, brought the neglect of "nativism" in favor of a view which stressed nurture as opposed to nature. And both prevalent psychologies, mental and physiological, were agreed upon the primacy of the environment as the source of the ideas that distinguished man from animals.

Thus, it can be said of the wholesale environmentalism which prevailed in the latter eighteenth century that the basis of three important characteristics of the modern outlook had been firmly established.[78] First, to understand man, one needed simply to understand his environment since he was a product of that environment. Second, since the observed differences between men are due to environmental influences, the old divisions between princes and paupers, haves and have nots, were no longer tenable and a new social-political philosophy developed which asserted the intrinsic equality of all men. And finally, a third major implication was that, man, now beholden only to his environment, had the right to manipulate that environment for his own purposes and to his own ends. No longer could the divine right of kings be viewed as an acceptable doctrine; men now had the power to define their own ends based upon their intrinsic human equality.

Perhaps nowhere is the spirit of this age better summed up than in the expressed sentiments of a dissident group of people, who, from their remote and savage corner of the globe, in early July of the year seventeen hundred and seventy-six, launched a movement, destined to become one of the greatest adventures in the history of man, with the following immortal words:

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[78]Lowry, op. cit., p. 55.

> We hold these truths to be self-evident; that all men are created equal; that they are endowed by their creator with certain unalienable rights; that among these are life, liberty and the pursuit of happiness; that to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any government becomes destructive to these ends, it is the right of the people to alter or abolish it, and to institute a new government, laying its foundations on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness.

2.3 IMMANUEL KANT: TRANSITION TO THE NINETEENTH CENTURY

As the eighteenth century drew to a close, the scientific enterprise seemed to be in rather serious philosophical trouble; recall, that Hume had succeeded, via his scepticism, in demonstrating that there was no validity to inductive inference and that scientific thinking amounted to nothing more than a "leap in the dark." Apparently, the working scientists of the day were not bothered by the fact that they were wondering in the dark and kept right on making advance after advance; all the while becoming more secure in the knowledge that science was the way to understand the facts of the universe. Of course, since the material universe was seen as a deterministic machine, they, along with Hume, saw little possibility of including the traditional teleological and valuational views of life within the scientific enterprise which concerned itself with the world of neutral fact.

It was the German philosopher Immanuel Kant who saw most clearly that something had gone wrong with the scientific account of reality. Kant (1724-1804), labored to bring together the two major trends of empiricism and rationalism which existed at that time. Kant's solution was to combine the apparently divergent approaches into a novel synthesis which left room, within the methods of scientific thought, for religious and moral thought. He accomplished this synthesis by pointing out that earlier scientists and philosophers had tended to concentrate upon either the rational or the empirical aspect of experience to the exclusion of the other one. Specifically, the rationalist trend had taken mathematics as the ideal standard of knowledge and therefore tended to see all knowledge as relations which existed between mathematical propositions. Because they saw the Will of God as the important source of order in the world, an order knowable in mathematical terms, they rejected perception as an unworthy and unreliable method of acquiring knowledge. This, of course, was the approach taken by Descartes. On the opposite side of the picture stood the empiricists, who asserted that whatever came from the rationalistic analysis was based upon the immediate data of self-awareness and that all knowledge therefore was based upon the awareness of mental states. John Locke and the mental mechanists exemplify this trend; and, as we have seen, the argument had reached a genuine impass in Hume's thought.

Kant started from the position that both factors, the empirical and the rational, were important not only to the philosophical basis of science but also to the long-standing problem of how to make a place for value in a world of fact. In this, he was actually providing for a reconciliation between science and religion and saw that one of the main impediments to his task was the metaphysical dualism of Descartes. Since Kant did not wish to reinforce his argument by metaphysical considerations, his was to be a Critique of Pure Reason, he had little use for the old separation of the knower from the known and of the subject from the object because that separation, which had appeared real to Descartes, was not a real substantive one. On the contrary, the introduction of independent minds and independent bodies (substances) created the need to have an intervening layer of "ideas" to act as a medium between them.[79] On this account, Kant saw little difference between the approaches of the empiricists and the rationalists since both were pursuing the implications of a faulty doctrine.

Kant surpassed the limitations inherent in the older view by admitting, with Hume, that all knowledge (not just scientific knowledge) arises from experience since without

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[79] Jones, A History of Western Philosophy, p. 814.

experience there would be no way to awaken the faculty of knowledge into action. "In order of time, therefore," Kant continues, "we have no knowledge antecedent to experience, and with experience all our knowledge begins"; however, though experience is a necessary condition, it is not in itself a sufficient condition. Kant elaborates,

> But though all our knowledge begins with experience, it does not follow that it all arises out of experience. For it may well be that even our empirical knowledge is made up of what we receive through impressions and of what our own faculty of knowledge (sensible impressions merely serving as the occasion) supplies from itself.[80]

He went on to specify that if it is the case that we make this sort of contribution to knowledge, then it will only be with a great deal of effort and skill that we can come to separate out the two components of our knowledge. He felt that the problem not only called for closer examination but would yield an answer to the question of:

> whether there is any knowledge that is independent of experience and even of all impressions of the senses.

Such knowledge, he felt, should be

> . . . entitled a priori and distinguished from the empirical, which has its sources a posteriori, that's, in experience.[81]

Kant, as we have said, was a philosopher and not

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[80]Immanuel Kant, quoted in Jones, Ibid., p. 820.

[81]Ibid., p. 822.

therefore, strictly interested in psychological questions. Yet, at this stage of scientific development it is hard to tell the two apart and Kant's formulations are destined to have important implications for psychological thought, especially that of his countrymen who were preparing to launch the psychological arck upon the scientific sea.

Of particular importance was his formulation of the hypothesis that knowledge is a joint product of sensory impressions and the structure of consciousness as given by the categories of human thought (a priori ideas). From this point-of-view, Kant saw that the spatial and temporal relations which we know in experience were universal in nature not because we experience space and time directly but rather, because space and time are forms of thought which determine the way we see the world. They are the framework of the world within which such problems as the one which plagued Hume, causality, are seen to be "categories of understanding." These categories are brought to the interpretation of sense impressions rather than being derived from sense impression. Therefore, it is the mind of man that provides the important notions with which he operates intellectually and scientifically.

An important implication of this position is that what is given in perceptual experience is only an appearance of what things are in themselves. That is, we can know only the "phenomena" and not the "noumena" because we can never escape the distortions introduced by the processes of our knowing the world. This realization led Kant to limit the realm of intellectual and scientific knowledge to those aspects of the world which are knowable in terms of the categories of understanding. Since we have no category of understanding which is capable of interpreting the world as a whole, but instead are restricted to the serialization of causality in time and space, Kant held that there was no method by which human intelligence could prove or disprove the existence of God.

This limitation upon the efficacy of reason, in the material world, led Kant to formulate a fundamental thesis which included two kinds of experience, each with different criteria of meaning and truth. The first, which we have already covered dealt with problems of reason, the second dealt with values and not facts. Since he saw that man experiences values as well as facts, Kant felt that there must also be categorical imperatives in the moral realm that matched the categories of understanding in the physical world. These categorical imperatives were, he believed responsible for the fact that:

> . . . the moral worth of an action does not lie in the effect expected from it, nor in any principle of action which requires to borrow its motive from this expected effect. . . . The preeminent good which we call moral can therefore consist in nothing else than the

> conception of law in itself, . . . this is a good which is already present in the person who acts accordingly, and we do not have to wait for it to appear first in the result.[82]

Categorical imperatives are to be seen then, as universal obligations which apply to all men irrespective of personal feelings and inclinations. These considerations led Kant to reject the concept of association by which Hume, for example, would have explained the gradual accrual of experienco into a form which only "seemed" to have the nature of a categorical imperative. In this way, Kant's formulation of categorical imperatives also provides an answer to the problem of free-will and determinism. This is the case because strict determinism can be viewed as operating in the realm of the sciences which are ultimately accountable to the categories of understanding; whereas, the categorical imperatives of the moral realm create an entirely different basis for religious and moral thought. This basis, Kant conceived, derived from man's practical reason, as opposed to his pure or theoretical reason and provides the ground for man's response to purpose and beauty.

Kant's philosophy has had many and profound effects upon wide areas of human knowledge and understanding. Of primary importance to the present context is that Kant's

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[82] Kant, Fundamental Principles of the Metaphysic of Morals, quoted in Jones, Ibid., p. 852.

new and unique synthesis of the rational and the empirical, finding as it did, an important place for the contribution which the mind brings to the confused flux of fragmentary sensory impressions, created a valid place in subsequent psychological thought for reference to the inherent operations of the mind. Therefore, Kant provided an alternative to psychological empiricism which was a true alternative in that it permitted speculation about the nature of psychological endowment without having to refer to the time-worn doctrine of innate ideas.

2.4 WHITEHEAD'S INVERSION OF KANT

As we leave Kant, here on the threshold of the nineteenth century and its direct contribution to the rise of modern psychology, it is important to single out several central concerns. First, Kant and those he influenced were still operating under the Newtonian cosmology and therefore can be expected to see the character of the newly revalidated, inherent operations of the mind, in just that light; therefore, their formulations are subject to the same limitations as their predecessors. Second, this realization provides the opportunity to make an important contrast between traditional philosophy and the philosophy of organism proposed by Whitehead.

Kant's innovation in philosophy was the introduction of the categorical scheme which provided for the ordering of experience as a function of man's subjective nature. Whitehead criticizes this position because Kant is still assuming, along with the entire post-Copernican era, that the sense objects which account for the sensory impressions are, in fact, disconnected, nonrelated bodies. This, Whitehead flatly denies as an example of the doctrine of simple location. Whitehead consistently maintains that the datum always contains its own interconnections and that these interconnections can only be ignored at the peril of completely inverting the true principles by which we function. That is, Whitehead asserts:

> The philosophy of organism is the inversion of Kant's philosophy. The Critique of Pure Reason describes the process by which subjective data pass into the appearance of an objective world. The philosophy of organism seeks to describe how objective data pass into subjective satisfaction, . . . for Kant, the world emerges from the subject; for the philosophy of organism, the subject emerges from the world.[83]

And again, so that the full impact will be felt:

> Thus for Kant the process whereby there is experience is a process from subjectivity to apparent objectivity. The philosophy of organism inverts this analysis, and explains the process as proceeding from objectivity to subjectivity, namely, from the objectivity, whereby the external world is a datum, to the subjectivity, whereby there is one individual experience.[84]

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[83]Whitehead, Process and Reality, p. 135.

[84]Ibid., p. 236.

An important clue to a more complete understanding of Whitehead's intent is to be found in the realization that the type of experience which traditional philosophers have talked about is habitually conceived as "experience [which] is the product of operations which lie among the higher of the human modes of functioning."[85] Whitehead is asserting that by restricting awareness to this level, we ignore more primitive forms of experience which he terms as the causally efficacious or noncognitive aspect of prehension, mentioned above in connection with Berkeley's philosophy.

Thus, for Kant, his predecessors and a goodly portion of his successors, especially in psychological fields, the goal or end product of the whole perceptual/cognitive enterprise is the "apparent" objective content of knowledge (objects). For Whitehead, objects are entities that have the potentiality for being included in the "feeling" (noncognitive apprehension, or prehension) which ultimately passes into the subjectivity or cognitive satisfaction of the experience. This end product or satisfaction, Whitehead terms "superject" rather than "subject" in an effort to show that it is in the "satisfaction"[86] of the prehensive unity that we find our final awareness and highest

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[85] Ibid., p. 172.

[86] See the second definition of prehension given in Chapter 2, Section 2.2.2.

expression of human capabilities.

It is not possible, at this time, to go beyond this brief excursion into the Whiteheadian alternative to traditional thought. Here, as with the thoughts of the other major formulators of the modern scientific and philosophical tradition, we have endeavored to plant the seeds of Whitehead's critical arguments in the same soil out of which grew the majority of the concepts which pertain to modern psychological and educational thought. Whitehead, as we have begun to show, implicates the whole modern era in his reappraisal, or better, inversion of philosophical understanding. In terms of impact upon psychological thought, one of the first manifestations of the conceptual rebirth inherent in the philosophy of organism, can be expected to come in matters which touch upon the topics of perception and cognition. This, as we shall more clearly see as time goes on, is not due to the character of Whitehead's thought but is, rather, a function of the fact that the older system developed those topics first and has dwelt upon various aspects of these topics the longest.

The philosophical development which followed upon Kant's approach was carried on primarily by Hegel and Schelling; both of whom attempted to establish a new basis for physical thought but instead of "giving physics wings" as they intended actually were putting "physics on the skids of fancy."[87] Whatever their effect and importance to philosophy, the line of development which leads to modern psychology does not follow their lead. In fact, James remarked that the "true time of philosophical development lies . . . not so much through Kant as around him";[88] and for our purposes it is particularly important to note that Whitehead considers his work as a "recurrence to pre-Kantian modes of thought."[89]

2.5 THE EARLY NINETEENTH CENTURY IN ENGLAND

As far as the beginning of the nineteenth century is concerned, there were two trends of importance to the development of psychology, one English, the other German. In England, associationism was receiving its final expression in the work of James Mill and the beginnings of its translation into a new physiological psychology were evident in the work of Alexander Bain; while on the continent, German science was reaching a new level of maturity in the work of men like J. F. Herbart. The character of Herbart's work is important for two reasons. First, his approach is more closely related to British associationism than it is to that of his countrymen who were under the influence of Kant.

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[87] Jaki, The Relevance of Physics, p. 45.

[88] James, The Principles of Psychology, I, p. 2.

[89] Whitehead, Process and Reality, p. vi.

And second, he not only contributed to the development of psychology but is also known as the father of scientific pedagogy.[90]

2.5.1 JAMES MILL (1773-1836)

Taking the direct line of development of associationism first, we can characterize the work of James Mill as representing the culmination of the whole associationistic movement. Also, in view of the proximity in time of his thought to the actual development of psychology as a science, it will be possible to focus increasing emphasis upon issues which are very close to those of much modern psychological thought.

By this time it seems hardly necessary to assert that we can expect to find a heavy Newtonian influence in Mill's thought, since Mill was indeed the true heir of the tradition spawned by Locke and carried forward by Berkeley, Hume and Hartley. Yet, there were also important differences in the details which Mill saw as important to the over-all associationist scheme.

One important shift to be found in Mill's thought is that in his discussion of association he actually used objects rather than sensible qualities as the basis of the discussion. In his description of the associative nature

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[90]Edwin G. Boring, A History of Experimental Psychology (New York: Appleton-Century-Crofts, 1929), p. 250.

of consciousness, Mill pointed out that:

> Thought follows thought; idea follows idea, incessantly. If our senses are awake, we are continually receiving sensation, . . . but not sensations alone. After sensations, ideas are perpetually excited of sensations formerly received; after those ideas, other ideas; and during the whole of our lives, a series of those two states of consciousness, called sensations and ideas, is constantly going on. I see a horse: that is a sensation. Immediately I think of his master: that is an idea.[91]

In making the separation that he does between the "two states of consciousness"--sensation and ideas--Mill is actually bowing to two important aspects of his philosophical ancestry. On the one hand, the need to make sensation primary and separate from ideas is a continuation of Locke's empiricism while, on the other hand, the need precisely to specify the elements of association (ideas), is surely a continuation of Hume and Hartley. Mill also went a step further with this sort of separation and in so doing, avoided the problems Hume had run into concerning causality. Here, Mill made the sharp separation between sensation and ideas work in his favor by restricting the operation of the law of association to the realm of ideas. That is to say, in those cases where sensations habitually occur in conjunction with one another, Mill was willing to allow that they did so according to the laws of nature which applied

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[91] James Mill, The Analysis of the Phenomena of the Human Mind, quoted in Boring, Ibid., p. 223.

to the objects that produced the sensations. Thus, the law of association of ideas is seen as a consequence of the concurrence observed in sensations which derive from the laws of the objects, and is an excellent case in point regarding Whitehead's assertion that modern science has remained "blandly indifferent to its refutation by Hume." From this assumption, it naturally followed that contiguity would be the single important variable of association.

In elaborating the nature of contiguity, Mill specified that there are two types of contiguity; he wrote:

> Of the order established among the objects of nature by which we mean the objects of our senses, two remarkable cases are all which here we are called upon to notice; the synchronous order, and the successive order. The synchronous order, or order of simultaneous existence, is the order in space; the successive order, or order of antecedent and consequent existence, is the order in time. Thus the various objects in my room, the chairs, the tables, the books, have a synchronous order or order in space. The falling spark, and the explosion of the gun powder, have the successive order, or order in time.[92]

Actually, Mill believed that the successive order of contiguous existence was the more important of the two because that is the mode of the sequence of thoughts as they appear in words and therefore, it is more frequent. This consideration leads into the criteria that Mill proposed to account for the variable strength of associations and,

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[92]Mill, Ibid., quoted in Lowry, The Evolution of Psychological Theory, p. 35.

since he had established a separation between sensations and ideas, he needed two sets of principles. On the perceptual or ideational side Mill had three principles: 1) permanence, to express the fact that permanent conviction must be stronger, 2) certainty, an expression of the subjective assurance felt in the association and 3) felicity, or the ease and speed with which the association is formed. As Boring[93] points out, this last principle is very closely linked to the modern formulation of reaction times as a measure of associative strength. On the side of sensation, Mill established the ideas of frequency and vividness as the prime determiners of the conditions of association.

One of the prime implications of this view, leads right into modern American psychology as the association theory of meaning that was proposed by Titchener in the early twentieth century. This implication primarily flows from the fact that Mill's view of association leads to a condition in which objects gain their objectivity by synchronous association. That is to say, in the idea of a tree or a house there are a great many simple ideas which have been united by association. Thus, meaning is seen to derive from the intimate natural association between the simple ideas which forms the context that accrues to either

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[93]Boring, A History of Experimental Psychology, p. 224.

initial sensation or initial ideas.

For the reason why James Mill is often characterized as the last associationist in the line of mental mechanism we have only to look at the outcome of his psychological theorizing. Here, Mill represents the inevitable outcome of Locke's empiricism because he takes the doctrine that ideas exist as Newtonian-like atoms in the mind (simple ideas) which are direct copies of the discrete sensory input and combines them, according to the Millian principles of contiguity, into complex ideas. Once complex ideas had been created, it was a natural step to carry the process to its conclusion by postulating that complex ideas themselves could be associated with one another by the same principles of contiguity so that one could end up with "duplex," "triplex," etc., ideas. Mill speaks directly to the point:

> Brick is one complex idea, mortar is another complex idea; these ideas, with ideas of position and quantity, compose my idea of a wall. . . . In the same manner my complex idea of glass, wood, and others, compose my duplex idea of a window; and these duplex ideas, united together, compose my idea of a house, which is made up of various duplex ideas. How many complex or duplex ideas are all united in the idea of furniture? How many more in the idea called Every Thing?[94]

This statement, when quoted, usually prompts the

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[94]Mill, Ibid., quoted in Boring, A History of Experimental Psychology, p. 226.

following sort of comments from those who have used it. Boring, for example, labels Mill's final theorizing "reductio ad absurdum" the result of utilizing a rational principle to "carry us even to the brink of absurdity."[95] Lowry is a bit more gentle but the devastation of the doctrine is just as complete when he comments to the effect that: "After James Mill's Analysis, there was simply nothing that Lockean mental mechanism could do for an encore. Its accounts with reality were now closed, and there was nothing further that could be said about the matter. . . . Given any complex mental phenomenon, the theory could--in principle--resolve it into its component parts."[96]

And so, the long line of associationist development finally came not only to its logical end but also to its actual conclusion in that its "success" was its failure. That is to say, Mill brought the doctrine closer to an apparent account of actual experience than any of his predecessors; thereby, exposing the superficial aspects of the underlying doctrine.

2.5.2 JOHN STUART MILL (1806-1873)

The next step in theoretical progression is found in John Stuart Mill, James' son. John Stuart avoided the

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[95] _Ibid_., p. 226.

[96] Lowry, _op_. _cit_., p. 37.

reduction that had proved his father's undoing by shifting the metaphysical basis of mental structure from a mechanical to a chemical analogy. This shift is important for two reasons. First, was the effect on the direct evolution of associationist thought and second, in the character of the shift in metaphor we find the first clear example of a theme that will be of great significance in later discussion; namely, the concept of levels of explanation and reality. Mill expressed his understanding of the matter as follows:

> It is obvious that the complex laws of thought and feeling not only may, but must, be generated from these simple laws [of association]. And it is to be remarked, that the case is not always one of Composition of Causes: the effect of concurring causes is not always precisely the sum of the effects of those causes when separate, not even always an effect of the same kind with them. . . . So it appears to me that the Complex Idea, formed by the blending together of several simpler ones, should, when it really appears simple (that is, when separate elements are not consciously distinguishable in it), be said to <u>result from</u> or be <u>generated by</u>, the simple ideas, not to consist of them. . . . These are cases of mental chemistry in which it is possible to say that the simple ideas generate, rather than that they compose, the complex ones.[97]

This formulation led Mill into a new arena of theoretical understanding. Since it was seen to be impossible

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[97] John Stewart Mill, <u>System of Logic Ratiocinative and Inductive</u>, quoted in Boring, <u>op</u>. <u>cit</u>., p. 230, Mill's emphasis.

to predict the character of a compound even if all the laws of the elements are known, Mill maintained that it was not only impossible to reason from the simple to the complex but also, in the case of mental phenomena, the only way to understand the phenomenon was to go directly to the experience to discover how a complex idea has been generated; reason alone is an insufficient proof. This emphasis on experiencing the resultant combination led directly into a position which helped to transfer the main force of psychological theorizing from the armchair to the laboratory. This shift of emphasis was also aided by the additional implication of Mill's formulation which held that even in those cases where the so-called "generative process" was known, it was impossible to deduce the laws of the resultant in advance. Thus, the laws of the resultant complex idea are only obtainable by reference to and direct experiment with the resultant. This emphasis upon experiment and reference to direct experience of the phenomenon, which grows naturally out of Mill's position, is a major factor in the transition which was to bring the label "psychologist," as opposed to philosopher, to those who followed J. S. Mill.

The second important aspect of Mill's theory, his introduction of a more inclusive, higher-order, metaphor in the explanation of mental phenomena (a translation of mental mechanism into mental chemistry), is an intimate part of a larger topic that is best treated as a unit. Accordingly, it is more appropriate to complete the introduction of the remainder of the individuals who stand on the threshold of modern psychological thought first, and to consider the broader implications of the whole movement when that is achieved.

2.5.3 ALEXANDER BAIN (1818-1903)

The last English philosopher-psychologist of importance to the rise of psychological thought is Alexander Bain. E. G. Boring concluded his review of Bain's work with the following summary:

> . . . we see that Bain anticipated much of later psychology, just as he represented the culmination of the old. . . . He stands exactly at a corner in the development of psychology, with philosophical psychology stretching out behind, and experimental physiological psychology lying ahead in a new direction. The psychologist of the twentieth century can read much of Bain with hearty approval; perhaps John Locke could have done the same.[98]

We may characterize Bain as representing the end of empirical associationism and the beginning of physiological experimentalism primarily because of some of the implications which flowed from his over-all point-of-view. First, he saw that in every psychological question there were two sides to consider, the "physical side" and the "mental

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[98] *Ibid.*, p. 240.

side."[99] This parallelism of mind and body in Bain can be seen in the light of the positions on the issue that had been generated practically two hundred years earlier. We earlier characterized Descartes as a dualist because of his separation between mind and body. Bain, while dualistic, was also a parallelist in that he did not specify that mind and body interacted explicitly as Descartes had done. In this, his thought can be traced to another seventeenth century thinker, G. W. Leibnitz, who had originated the interpretation. This problem was perhaps more acute for the nineteenth century thinkers because of the tremendous elaboration of physical thought which had occurred in the interim period. Whatever, Bain was loath to define mind or soul in such a way as to "materialize" it and so, maintained a separation between the two.

Separating mind from body in this way, is apparently one of the best ways to insure that a theorist will focus upon physiological phenomena as explanations of mental events, since there seems no other alternative. In addition, Bain wrote at a time when great advances had been made in the various areas of brain function, sensation, nerve excitation and reflexology. Thus, having a wealth of

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[99]In Bain, and his near contemporaries in the early second half of the nineteenth century, we will see an increasing emphasis upon the dual aspects of physical and mental approaches to psychological phenomena.

technological information at hand, Bain could and did devote a lot of time to those topics. When he turned to discussions of the older more general philosophical issues, he often (usually) failed to draw any important connections between the two.[100] Of course, this situation is neither unique to Bain nor is it restricted to the nineteenth century and the reasons behind this condition will form an important topic of discussion in the next section when the general nature of the transition from philosophy to the natural science of psychology is discussed.

In addition to the older philosophical characteristics which are found in Bain's psychology, there is also a strictly associationistic view of mental functioning which required both contiguity and similarity as basic principles of operation. Since additional inquiry into the nature of associationism as used by Bain would not add significantly to that which has already been presented, it is best to leave Bain at this point, standing on the corner as it were, and to conclude the consideration of the history of British associationism with a general summary of its main characteristics.

2.5.6 SUMMARY AND CRITIQUE OF ASSOCIATIONISM

In this presentation of British associationistic

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[100] Ibid., p. 238.

psychology and its derivation from the school of empirical philosophy, we have repeatedly asserted that the entire movement was inspired by, modeled on, and overshadowed by Newtonian physical theory. Accordingly, it is most fitting to summarize the entire movement from this perspective.

One of the first and most consistent points of correspondence between Newtonian mechanics and mental mechanics is the ever-present underlying assumption that because physical phenomena resolve into elementary particles, mental phenomena should do the same. All mental mechanists, of whatever stripe, were united in the view that whatever it was that went on as a result of sensory stimulation (sensations, impressions, etc.), was to be seen in terms of elementary mental particles. It does not matter whether they were called "ideas," "images," "copies," or "representations" in each and every case that which constituted the lowest order of internal mental structure was conceived to be a punctiform mental particle which was a direct copy of its physical counterpart.

In terms of the Whiteheadian arguments presented earlier, specifically <u>The Fallacy of Misplaced Concreteness</u>, it is clear that the doctrine of simple location in which entities are seen to be isolated and separately describable, requiring no reference to other entities for their existence, is perfectly applicable to mental ideas as represented in the associationist tradition. A second aspect of the over-all fallacy is the so-called doctrine of mere sensation which asserts that the primary activity in the act of experiencing is simply the bare subjective entertainment of the sensations. That is, the data of the world are not distorted by the subject's form of reception. Obviously, in empiricism we have found nothing to contravene this assertion and have, in fact, seen its truth demonstrated. For the sake of completeness, we should also note in passing, that the third factor in the fallacy, the substance-quality separation is not accentuated in this case due to the nature of empiricist thought. Certainly, the extreme idealism of Berkeley with its total lack of reliance upon external or substantive existence plays down this aspect of the fallacy, though it hardly seems necessary to point out that this only postponed the consideration of the problem and was not a solution.

Another important point of correspondence between Newtonian and mental mechanism is the general need which mental mechanists found to postulate some sort of relation existing between the isolated ideas. This is the problem of "action at a distance" mentioned earlier and Newton's solution of the problem, achieved by the caveat of creating the ether, was mirrored in many of the associationists' theories. Locke spoke of "agreement" and "repugnancy" between ideas and we have quoted Hume to the effect that "there is a kind of attraction, which in the mental world will be found to have as extraordinary effects as in the natural." Additionally, we have seen that the consideration of this matter was an important catalyst in Hartley's creation of "vibratiuncles." It is also interesting to note, that James Mill was not concerned with this issue and found no place for it in his "complete" system of mental mechanics. This situation is, in all probability, due to the fact that in Mill we find the retention of the ubiquitous atomism but with the added character that the elements are now ideas of sensible objects rather than sensible qualities. Thus, Mill's use of objects as elements introduced a level of phenomenal reality that obviated the need to postulate a force by which simple elements could be compounded. Of course, this created other problems, but the point at issue is the fact that an apparently innocent shift in level of description has profound implications for the basic abstractions of the system. Had Mill realized this point, it seems doubtful that he would have gone on to the ultimate extremes that he did.

While associationism was able to animate its functioning entities to some degree with various ad hoc assumptions, it never did achieve what can be considered to be an active view of mental processes. In this regard it is even less active than its physical model since notion and dynamism had always been important components of the parent metaphysical view. This condition, no doubt, was largely attributable to the predominant empiricist position which was generally held by the associationists and, of course, was a main factor in the criticism which Kant levied against them. The logic underlying the whole formulation was also strictly Newtonian in nature, briefly considered, it amounts to this.

All mental mechanists had been concerned with the fact that sensations of objects were actually given in experience as a variety of separately distinguishable sensory qualities (except for Mill, who operated with ideas). Now, because of the original Newtonian assumption regarding the character of sensations and ideas, i.e., simply located entities, the mental mechanists were obliged to assert that the sensation of a whole object was broken down or represented in perception as an assemblage of separable sensory qualities. Further, these decomposed sensations which resulted in "simple sensations" were restricted to giving rise to "simple ideas" out of which, according to some principle, e.g., contiguity, it was possible to reconstruct a complex idea of the original object.

It seems fair to assert that the primary reason for the associationists' commitment to this complex mental paradigm was their prior commitment to the doctrine of simply located entities. For, had they been able to avoid that prior assumption there would have been no need to elaborate the intervening stages of conversion which first created the simple out of the complex and then recreated the complex out of the simple. Surely, there was no other restriction which prevented them from making the direct and equally reasonable assumption that complex sensations are directly responsible for the creation of complex ideas.

In addition to those aspects which are directly attributable to the Newtonian cosmology, we should also remark that the original separation between mind and body which arose in the thought of Descartes has not only been continued but actually heightened by the progression of the movement. To the end, as seen in the thought of Alexander Bain, the problem was not only implicit in the whole era but at times was explicitly formulated as an important principle of scientific explanation.

2.6 THE EARLY NINETEENTH CENTURY IN GERMANY

The first half of the nineteenth century in Germany was an important time in which the foundations for the founding of experimental psychology were laid. Up until this time there had been little direct contribution from the Germans; however, the work of Immanuel Kant was coupled with a general increase in the tempo of intellectual life that seems to have provided a favorable environment for broad scale development in the physical and mental sciences. As might be expected in the type of theorizing that went on in those early decades of the nineteenth century that is relevant to the continued rise of psychological thought, we can find the further elaboration of the earlier traditions of mental and physiological mechanism. An important aspect of the material to be considered in this section is the continued impress of the Newtonian cosmology. In this treatment, we will be less concerned to demonstrate the validity of that continued assertion and will pay more attention to the character of the theorizing which results from the further elaboration of concepts in the physical sciences.

When we first considered the early nineteenth century in England, there was no great need to include the cultural background of that time as an important factor in the development of the empiricist associationist thought. This is primarily due to the fact that the modes of thought which were relevant to our concerns were outgrowths of long-standing traditional doctrines and were not heavily influenced by the influx of information from the rapidly developing corpus of scientific knowledge. The corresponding situation in Germany is quite another matter.

The early part of the nineteenth century was a fruitful time of great technological advances which were combined with an optimistic outlook in diverse areas of life. While the industrial revolution was born in England, it was the Germans who realized that great gains were also to be had by combining an intimate and disciplined intellectual study of scientific ideas with the search for new technology. Whitehead remarks of the German intellectual that "their feats of scholarship during the nineteenth century were the admiration of the world."[101]

Those aspects of the historical development of psychological thought which will be covered in this section are important examples of that high water mark of intellectual achievement. In addition, a good portion of that history will show the narrowing trend which is engendered by the increased specificity of the developing fields of investigation. Here, as we seek critical insight into the nature of those times, it hardly seems necessary to point out that seeds of the specialized disciplines which were sown during these early days of scientific development have, today, grown into the great compartments of specialized knowledge by which we name our disciplines and structure our universities.

"There have always been people who devoted their lives to definite regions of thought" Whitehead remarks concerning

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[101]Whitehead, Science and the Modern World, p. 97.

the developing specialization of the early nineteenth century;

> In particular, lawyers, and the Clergy of the Christian churches form obvious examples of such specialism. But the full self-conscious realization of the power of professionalism in knowledge in all its departments, and of the way to produce the professionals, and of the importance of knowledge to the advance of technology, and of the methods by which abstract knowledge can be connected with technology, and of the boundless possibilities of technological advance--the realization of all these things was first completely attained in the nineteenth century; and among the various countries, chiefly in Germany.[102]

And indeed it was that "chiefly in Germany" came the impetus to a greatly sophisticated style of psychological thought, a style which will increasingly emphasize restricting the psychological field to sense objects and minor aspects of human sentience. Yet, for all its success, it has never been without opposition from those who sought to include a more complete repertoire of human behavior within the domain of psychological science. We will trace this all important interaction between the two main contrasting views of psychological science in the next section; for the present, it is important to consider the general scientific tenor of the times.

2.6.1 J. F. HERBART (1776-1841)

Herbart is important in the present context because

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[102] Ibid., p. 97.

his work was a direct influence upon both Fechner and Wundt, two figures of primary importance in establishing experimental psychology; he was a transition figure in the shift from philosophy to experimentalism and combined many diverse concepts into what appeared to be a complete psychology.

Herbart maintained that psychology was a science (Wissenshaft) which was grounded in experience; yet, he also held that since there was no obvious way of experimenting with the mind, psychology could not be experimental. Instead, the basis of psychology was seen to be metaphysical, which meant to Herbart that it was possible to create a mathematical description of the metaphysical elements which comprised the mind. While Herbart held that the mind was unitary and could not be divided into functional parts, he readily allowed the influence of both the Newtonian idea of attractive and repulsive forces and the character of his mathematical treatment of the metaphysical "ideas" to lead him into explicit formulations concerning the character of mental operations. It is necessary to touch on these factors because some of them are to become very important in the history of psychology.

Herbart's "ideas" were seen to interact and to have varying strengths; accordingly, they could attract or repel each other in ways which were expressable in mathematical equations. In this over-all view he is rather close to the line of mental mechanists we have followed; but, he also added an important element. Clearness in consciousness, he felt, was related to the force of action of an idea, and active ideas were conceived of in strict Newtonian fashion:

> Every movement of the ideas is confined between two fixed points: their state of complete inhibition, their state of complete liberty, and there is a natural and constant effort of all the ideas to revert to their state of complete liberty (absence of inhibition).[103]

This dynamic view of mental mechanism underlies the creation of an entirely new aspect of mental science and one which will become of increasing importance. The genesis of the concept goes like this: ideas which are not opposed to one another may coexist in consciousness and contribute to a simple mental act. However, since we are not simultaneously aware of all ideas, it must be that in those cases where ideas oppose one another the stronger (clearer) of the two must repel the other out of consciousness. These suppressed ideas were seen to have passed from a "state of reality" to a "state of tendency" and a "state of tendency" is another name for an unconscious conscious or <u>unconscious</u>. Thus, we have the first explicit formulation of the unconscious within the ranks of psychological

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[103]Johann F. Herbart, quoted in Boring, <u>op</u>. <u>cit</u>., p. 255.

theorists. We did not meet this earlier because the British had not discriminated between consciousness and mind and simply assumed that they were identical.

In extending this mechanical analogy, Herbart came up with another important concept--threshold or, in his terminology, limen of consciousness.

> By the limen of consciousness I mean those limits that an idea seems to overlap in passing from a state of complete inhibition to a state of real idea.[104]

Thus, mental content which is suppressed still exists and according to its "natural and constant effort to revert to a state of complete liberty" is actually attracted back into consciousness by its own efforts. Therefore, the unconscious is also seen to be dynamic and as such can have an effect upon conscious thought. For this mechanism Herbart recurred to the philosophy of Leibnitz and borrowed the concept of "apperception" which he felt explained how conscious ideas could select from among the unconscious ones those which were consonant with themselves. Since his doctrine explicitly stated that consciousness was a unitary thing, the assimilation of ideas into it from the unconscious, was seen as adding to the totality of ideas which already existed there and which he named, the "apperceptive mass." The concept of apperceptive mass became, in the

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[104]Ibid., p. 256.

late nineteenth and early twentieth centuries an important characterization of the psychological processes which were thought to underlie the process of education.

Herbart, then, can be seen as the popularizer, within psychological theory of the idea of the unconscious, Leibnitz being the chief philosophical mentor. His concept of limen (threshold) is obviously well known and became an important tool in the hands of Fechner whom we shall consider shortly. Also, Wundt will be seen to recur to the Herbartian unconscious in order to explain perceptual phenomena. However, lest we be carried too far along by the similarity of the formulations, Boring[105] points out that Freud's concept of the unconscious could have come from Herbart but in fact did not; we will however, be able to attribute the origin of the concept to Fechner and also demonstrate its link to the physical sciences.

2.6.2 M. W. DROBISCH (1802-1896)

In Drobisch are to be found the seeds of another mechanistic formulation of a higher-order mental phenomenon; this time, the concepts which were developed by Herbart are extended to include emotion and motivation. In this, we have another clear example of the theoretical dynamics which characterize the increasing elaboration of the Newtonian mechanism. First, for the basis of Drobisch's

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[105] Boring, op. cit., p. 257.

system we find Herbart's psychology:

> The fact that only a few ideas can enter our consciousness at once, shows to be sure at first glance, that they displace, suppress, therefore, as it were, expel one another; but also on the other hand, that they are not able to avoid one another, but are held together by an attractive force. The same thing likewise appears in associations, those quite involuntary and artless combinations of simultaneous ideas. It is, therefore, possible to attribute similar attractive and repellant forces to ideas, after analogy of the physical-chemical hypothesis of attractions and repulsions of elements.[106]

Drobisch's commitment to mental mechanism ended in a Newtonian theory of motivation and emotion because he conceived of the relationship between conscious and unconscious as a state of dynamic equilibrium. That is to say, since new perceptions were always adding new ideas there must be a continued rebalancing between the two. Since he felt that the state of equilibrium was more natural, the state of disequilibrium would be unnatural, therefore unpleasant and would be the source of our feelings and desires.

> If I have a feeling of . . . equilibrium, a change in it will be a feeling of disturbance. . . . The feeling of psychological equilibrium is precisely similar to that of bodily health: of both there exists no positive feeling. The body as well as the mind is in a state of equilibrium when one has no feeling of its activities, just as a machine in which there is the least possible friction makes but little noise. Desires and feelings are, therefore, the indices of the deviation from the state

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[106]Moritz W. Drobisch, quoted in Lowry, op. cit., p. 73.

of equilibrium of ideas.[107]

2.6.3 TRANSITION TO PHYSIOLOGICAL THEORIZING

With this brief introduction into some of specific examples of theorizing in the early nineteenth century, we are in a better position to explore the general character of the transition to more empirical forms of psychological theorizing. In this, we will see that the overt and thorogoing metaphysical approach which was evident, for example, in Herbart does not survive but that aspects of his psychology which derived from that metaphysic, his empiricism, mathematics, notions of activity and the concept of threshold, are all taken over and built into a new structure which is heavily influenced by physiology and physics.

An interesting summary of the character of these times has been provided by Lowry[108] in which he recounts the nature of the changes that were taking place in the area of physiological mechanism at the beginning of the nineteenth century. First of all, there was an elaboration of the original doctrine of physiological mechanism which is found in the philosophy of Descartes. We have seen[109] how Descartes' opposition to the ancient view of vital bodily

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[107]Drobisch, quoted in Ibid., p. 74.

[108]Lowry, The Evolution of Psychological Theory, Chapters 5 and 6.

[109]Cf., Chapter 1, Section 1.2.3, René Descartes.

activities as imposed by an external source grew out of his conviction that only unextended mental substance could respond to such external, spiritual influence. Bodies on the other hand, were "mechanical" in nature and their vital functions of heat and movement were seen to be the natural outgrowths of mechanical action. Thus Descartes could hold that the soul left the body because the heat and movement had stopped rather than the reverse.

Through the intervening ages there was an increasing dialogue between the vitalists and the mechanists in which the mechanists, largely under the influence of physiological discovery finally won out. However, not all vitalism was a simple mystical doctrine as indicated in the following reasoned statement made by an English anatomist in the last quarter of the eighteenth century. John Hunter felt that:

> Animal and vegetable substances differ from common matter in having a power super added totally different from any other known property of matter, out of which arise various new properties; it cannot arise out of any peculiar modification of matter, but appears to be something super added. . . . Organization may arise out of living parts, and produce action; but life can never arise out of, and depend on, organization. . . . Organization and life are two different things.[110]

In this example, Hunter is pinpointing an important property of organizational hierarchies that will figure significantly in future discussion. Here, we will simply note that such

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[110] John Hunter, quoted in *Ibid.*, p. 75.

styles of thought were effectly swept aside by the great successes of those mechanistic physiologists who saw all phenomena as directly caused by combinations of elementary particles which existed at the same level of being. Nor is all the credit or blame to be given to the physiologists since it was a character of the age that the idea of atomicity should permeate all phases of scientific activity. For example, biological thought had assumed a new maturity and also contributed to the acceptance of the validity of the atomistic interpretation when Schleiden and Schwann established cell theory in 1839. "Thus by 1840," Whitehead remarks, "biology and chemistry were established on an atomic basis. The final triumph of atomism had to wait for the arrival of electrons at the end of the century."[111]

An example of the transition to complete mechanism is this 1842 version of the doctrine of vitalism which was expressed by the chemist Justus Liebig:

> The vital force causes a decomposition of the constituents of food, and destroys the force of attraction which is continually exerted between their molecules. . . . It causes new compounds to assume forms altogether different from those which are the result of the attraction of cohesion when acting freely . . . there is nothing to prevent us from considering the vital force as a peculiar property, which is possessed by certain material bodies and becomes sensible when their elementary particles are combined in a certain arrangement

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[111] Whitehead, Science and the Modern World, p. 100.

or form.[112]

Liebig's thoughts on digestion are also indicative of the main character of thought concerning the nervous system. In this case the central issues of concern involved the nature of nervous activity, the type of conduction which was involved in nervous activity and the type of scientific explanation which was appropriate to describe the phenomena. Focusing first upon the nature of nervous activity, we find that the naive doctrines of Descartes (hydraulics and tubes) and Hartley (vibratory motions) have been displaced by Galvani's 1780 discovery that nervous activity is electrical and by the continued elaboration of increasingly sophisticated electrophysiological techniques, e.g., Volta in 1800, such that, again, by 1840 nervous activity was universally viewed as being electrical in nature. Further since even the "electricians" of the age, as those who studied electrical phenomena called themselves, were convinced that electrical phenomena could be explained by Newtonian principles there seemed to be an important metaphysical similarity between the various branches of the scientific enterprise.

Not only were the general electrical properties known and understood but also their unidirectional nature was widely accepted. Broad scale studies of the peripheral

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[112]Justus Liebig, quoted in Lowry, op. cit., p. 76.

nervous system had shown that the peripheral nerves conduct in a "forward" direction, afferent activity, and that motor nerves, on the other hand, were essentially efferent in nature. With this knowledge of the nature of the inputs and outputs of the central nervous system, it was all too compelling to view its activity in terms of another very important and central part of a seemingly similar communications apparatus--the telephone system; and so, in the wake of A. G. Bell's first telephone conversation on the twenty-third of May in the year 1844, man's central nervous system became a very complicated electrical switchboard.

It is important to note that in spite of the modern technological basis of this analogy, the long-standing reflexive character of the nervous system is retained, due to the fact that the functional nature of the system does not depend upon the exact technology involved.

2.6.4 CONSERVATION OF ENERGY: A NEW PRINCIPLE

In the earlier discussion of the underlying dynamics which operated to channel the theorizing of the British associationists into an otherwise unnecessary and excessively complex doctrine of mental functioning, i.e., the translation from complex to simple sensations and from simple ideas to complex ideas, primary stress was placed upon their prior commitment to the physical and metaphysical validity of the existence of isolable elementary particles;

hence, the applicability of Whitehead's doctrine of simple location. Of importance in the present context is the fact that having accepted the doctrine of atomicity and the laws attendant to those assumptions, physical scientists were moving to understand further implications of those laws. Thus, at a time when there was great interest in the ideas of conservation of force and energy, the reflection of those thoughts is also to be found in physiological science and ultimately in psychology. Therefore, it is not surprising to find the same sort of underlying dynamic which was implicit in the earlier century in operation here.

We have said something of the conflict between the mechanists and the vitalists as regards the nature of biological functioning but it is important to pursue the matter a little further in order to detect the greater delicacy of the issue. In this discussion, the figure of Hermann Helmholtz will loom large because he was an important figure in physics, physiology and psychology.

The whole argument will boil down to the fact that the mechanists can be construed as saying that all phenomena, including those of living matter, will ultimately be explained in terms of the established principles of the physical science. However, that is to form an arbitrary dichotomy between a fancied mystical vitalism and an exaggerated mechanistic determinism which is really an insult to the genius and integrity of the individuals involved, the real issue is a bit more involved than that.

An important aspect of the whole issue involves the "theory of heat" as known to physicists. As in so many other areas of scientific endeavor, the older caloric concept of heat which involved the interpretation of the phenomenon as a fluid which flowed from place to place, i.e., hot to cold, was being replaced by the experimentally derived interpretation that heat resulted from the "vibration of the corpuscles of bodies." Joule had finally established the so-called mechanical equivalent of heat and Helmholtz's first scientific paper was a work in which he tied together the various mechanical forces in the universe in such a way that the heat which was a necessary by-product of all such action became an important factor in the formulation of the "constancy principle." The constancy principle means that the various forms of physical energy can be converted into one another with no gain or loss in the process. Now for an individual who was both a physicist and a physician trained in physiology, it was only natural that such a concept should also apply to the matter which happened to be associated with living organisms. And so, the vitalist mechanist controversy reached a new level of sophistication with the realization that vital processes did not have to create something out of nothing, as it were, but in accord with the principle of constancy it is possible to conceive that a vital process is simply one in which there is a qualitative transfer of energy within the system while the total energy of the system remains quantitatively constant. This formulation of the quantitative constancy of energy can be seen as a further elaboration of Newton's three principles of motion which essentially asserted the constancy of motion or the conservation of force as opposed to the conservation of energy.

However, the fact that simple-minded vitalism is incompatible with the conservation of energy does not mean that Helmholtz and his contemporaries held out for a strictly mechanical interpretation of life. In fact, there was widespread support for the position that physics could not subsume all biological phenomena. What the true mechanist assertion came to then, was the fact that while physical life processes could conserve heat, and perhaps be modeled on a model of a steam engine, there was no need to equate life with machine processes. For his part, Helmholtz held that since the life processes produced mechanical and chemical effects, "their effects must be ruled by necessity, and must always be the same when acting under the same conditions; and so there cannot exist any arbitrary choice in the direction of their actions."[113] Seen in this light,

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[113] Hermann Helmholtz, On the Application of the Laws of Conservation of Force to Organic Nature, quoted in Jaki, The Relevance of Physics, p. 298.

the actual position taken by many prominent men of that time was more of the nature of an assertion that physical processes were, after all, physical processes and that while life did not necessarily have to be totally identified with mechanical processes, its interface with the material world certainly did have to conform to established law. Yet, it is also true that the only way for physiology to advance was to seek the continued explanation of all life phenomena in terms of the physico-chemical processes upon which they were based.

That it is possible to temper mechanistic determinacy when focusing upon specific issues of a highly quantifyable theoretical nature, should not however, foster the conclusion that the overriding cosmology of the entire age was not, to the depths of its mechanical heart, built upon a conceptualization of an indefinite and infinite universe, bound together by the laws of its components which all occupy the same level of being. Perhaps the following are more indicative of the over-all frame of reference. In the mid-eighteenth century, we find Voltaire expressing the sentiment that it would be strange indeed:

> that all nature, all the planets, should obey eternal laws, and that there should be a little animal, five feet high, who in contempt of these laws, could act as he pleased, solely according to his caprice. He would act at random, but we know that randomness means nothing. We have merely invented the word

> to denote the known effect of all unknown causes.[114]

And, lest we are too inclined to excuse the "ignorance" of early scientists and men of letters and pride ourselves on the maturity of modern science, we should not forget that standing upon the threshold of our own century we find the same point-of-view represented in no less a thinker than Bertrand Russell, who, with zeal reminiscent of religious fervor proclaimed:

> . . . man is a product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and beliefs, are but the accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; that all the labors of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins--all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built.[115]

Actually, Russell is right, as far as he goes; for it is true that there can be no other alternative except

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[114]Voltaire, Ignorant Philosopher, quoted in Ibid., p. 375.

[115]Bertrand Russell, A Free Man's Worship, quoted in Ibid., p. 379.

"unyielding despair" for a system which is based upon a mechanistic cosmology. Now, however, there are alternatives to this view which not only include Russell's science but also modern science within a framework which unites the separate universes of physical and mental existence into a meaningful whole. We will consider the foundations of this view in the next chapter after the relation of modern psychology to the older view has been examined.

2.6.5 FURTHER DEVELOPMENTS IN PRE-EXPERIMENTAL PSYCHOLOGY

The next major step in the transition from metaphysical to physiological psychology is found in the successor of Herbart, Rudolph Hermann Lotze (1817-1881). Lotze was opposed to pure materialism and sought anti-mechanical system while at the same time bringing a greater wealth of physiological fact into psychology. He is best known for his theory of space perception in which he tried to combine the modern understanding of the nervous system and its electrical characteristics into meaningful description of how space is perceived.

We have seen that the old empiricist view somehow entailed the notion that small copies of objects are represented in the mind in ways which yield the direct perception space and therefore the objects are perceived spatially. By Lotze's time, this view had become untenable due to the fact that the nervous system was now seen as a complex of individual circuits which in some way conducted impulses to the central nervous system. Therefore, Lotze held that while the retina is stimulated by a spatial signal, the image on the retina was sent to a projection area in the brain where it was known to the mind not as an objective image but as the perceived condition of the nerves in that area.

Since advanced anatomical and physiological understanding dictated that whatever information reached the central nervous system had to be in the form of discrete elements, it was a pressing problem to describe how it was possible that unified perceptions could be formed. In the various answers to this problem are found the beginnings of the controversy, within modern science, betweeen the nativists and the empiricists. For his part, Lotze took a rather Kantian nativistic outlook by asserting that the mind could not conjure up space out of something which was not spatial and therefore the ability to perceive space must be due to some inherent property of the mind. To make this intelligible, Lotze had to specify that the excitation of any receptor neuron produced two signals: one which was representative of the content of the image of excitation and the other which was a "local sign" or a signal to the mind which allowed it to determine which receptor had been excited. From the combined information contained in the local signs of the whole image the mind was supposed to have derived a pattern of intensities which could be correlated with the movements of the body to produce the perception of solid space.

In terms of the nativist empiricist controversy, Lotze actually included both views since the theory required repeated experience with sensations and signs in order to perceive space and yet there was also a requirement to have an inherent capacity which could interpret the signs in order to arrange the content spatially.

Herbart's concept of the unconscious also came into the picture as a description of how it was possible that all of the processing relating to local signs could go on without conscious recognition of the process. Lotze also used this explanation in cases where there was perception of objects without any movement of the body by postulating that it was possible for the mind to experience an "incipient movement" which was known only in the unconscious. Note that the concept of unconscious here takes on a new coloration in that it now includes mental contents which are actually operations whose outcome is required for normal conscious sentience rather than simply a store house for excess ideational elements.

One of the major alternatives to the theory put forth by Lotze came from Ewald Hering (1834-1918). Hering is also known for his theory of color vision. In both the case of space perception and color vision, Hering found himself at odds with Helmholtz who also had theories for these types of phenomena. The great controversy between them is variously known as the nativist empiricist or nature nurture question and is, obviously, still an open issue in most psychological theory.

Hering is identified as a proponent of nativism because his theory of space perception, which he put forward as an alternative to Lotze's, relied upon a good deal of internal preprogramming in order to explain space perception. Lotze's local signs were too cumbersome for Hering since that postulate effectively doubled the neural hardware required for visual processing. Instead, Hering relied upon an analogy of a simple coordinate system in which each retinal receptor was thought of as fitted into a grid such that it actually produced three signals or "spatial feelings" as Hering called them. These are simply, in today's language, signals on the X, Y and Z axis which yielded, in Hering's view, information about the horizontal, vertical and depth "feelings" of a given retinal stimulation. In accounting for stereoscopic vision Hering was forced to assume that the third signal, or depth signal, could assume either positive or negative values.

Helmholtz on the other hand is an empiricist whose roots are to be found in John Locke. Therefore, in contrast to the rather popular Kantian influence, Helmholtz was maintaining that an object was nothing more than an aggregate of sensations which fitted together because they were habitually found together. However, in line with the more recent views which espoused an active nature for the mind, Helmholtz believed that mental processes contained an active unconscious; and the unconscious processes that actually transformed the punctiform sensations which had been projected to the cortex, were "irresistible" in the sense that they were automatic and not subject to conscious recognition. Those processes which were viewed as among the "irresistible" operations of the unconscious, were thought to have been developed in empirical fashion by association and repetition. In addition to an empirically derived irresistible structure for the active unconscious, Helmholtz also held that the form of the process in the unconscious was the same as for conscious inferences from analogy. In this way, Helmholtz sought to insure the possibility that a conclusion could be reached in a novel case or in the case of an ambiguous perceptual illusion that shifted its perceptual appearance. Perhaps the true meaning of unconscious inference is best summed up by Helmholtz himself in a passage from his work concerning physiological optics:

> The psychic activities, by which we arrive at the judgement that a certain object of a

> certain character exists before us at a certain place, are generally not conscious activities but unconscious ones. In their results they are equivalent to an <u>inference</u>, in so far as we achieve, by way of the observed effect upon our senses, the idea of the causes of this effect, even though in fact it is invariably only the nervous excitations, the effects, that we can perceive directly, and never the external objects. . . . It may be permissible to designate the psychic acts of ordinary perception as <u>unconscious inferences</u> as this name distinguishes them sufficiently from the ordinary, so-called, conscious inferences. While the similarity of the psychic activities of the two cases has been doubted and will perhaps always be doubted, still no doubt can remain of the similarity of the results of such unconscious . . . and conscious inferences.[116]

Thus, the Helmholtzian theory of perception is one which attempts to provide for the outcome of observed experience as well as giving a reasonable account of the scientific data relevant to the matter. In including these aspects, Helmholtz is opening the way for Wundt to formulate the explicit mechanism of introspection.

An important aspect of Helmholtz's theory is that it is the tie between the tradition of British associationism and the German roots of psychological theory found in Wundt's introspective psychology.[117] Since this is the case, it is well to focus more clearly upon the important operating characteristics of the theory. The basic term in

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[116] Helmholtz, <u>Handbook of Physiological Optics</u>, quoted in Boring, <u>op</u>. <u>cit</u>., p. 309, Helmholtz's emphasis.

[117] Boring, <u>op</u>. <u>cit</u>., p. 312.

the theoretical structure is the bare sensory pattern which is derived from the object. This pattern is however, rarely pure since it is almost always added to by the results or the irresistible unconscious processes and supplemented by memory. Thus, objects in the world are the product of a Lockian associationism supplemented by the observer's mental apparatus, especially the unconscious. This formulation also retains the doctrine of primary and secondary qualities because it clearly specifies that in the trial and error accumulation of unconscious experience, we perform a sort of "mental experimentation" by which we learn which properties of the objects can be changed by our additions (secondary qualities) and which properties cannot be changed (primary qualitios).

In closing this account of Helmholtz's perceptual theory, we should note that cases where the mind is active without receiving sense impressions are called imagination. Such experiences were labeled <u>Vorstellungen</u> by Helmholtz, a word which is usually rendered as <u>idea</u> in English, but which, in the original, carries the definite connotation of something that is cast up out of the unconscious into the conscious; it thus seems to imply a more active derivation for the experience while at the same time indicating that it came from somewhere intimately associated with its host as opposed to coming from "out of the blue," as it were.

CHAPTER THREE

3.0 THE FOUNDING OF EXPERIMENTAL PSYCHOLOGY

At this point in the discussion, as we turn to the actual birth of experimental psychology, it is essential to make two major elements in the discussion quite explicit. On the one hand, we will attribute the actual creation of experimental psychology to Gustav Fechner rather than Wilhelm Wundt and therefore, give a more complete account of his psychology than is usually the case, while on the other hand, we will utilize the neglected half of Fechner's psychology as a major element in structuring the remainder of our consideration of the development of psychology.[118]

In considering the "founding" of experimental psychology, it is important to see the "new" developments in light of their historical context. In actuality, the development of this new phase of psychological thought is simply the confluence of two long-standing streams of historical thought, modern science and modern philosophy. We have quoted Alexander Koyré's statement to the effect that the crisis of the modern consciousness is a result of the

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[118]No less an authority than Boring feels quite an ambivalence about the matter: "One may call him [Fechner] the founder of experimental psychology, or one may assign that title to Wundt, it does not matter"; Boring, op. cit., p. 295, emphasis added.

For reasons that will become clearer in what is to follow, what matters is that Wundt effectively developed only half of Fechner's psychophysics and the neglected half not only haunted him then, but is still with us today, as we will endeavor to show.

scientific revolution which has colored the entire history of western man since its inception in the sixteenth century. His assertion is that this revolution has:

> . . . changed the very framework and pattern of our thinking and of which modern science and modern philosophy are, at the same time, the root and the fruit.

The importance of that statement is, perhaps, a bit more obvious now that we have traced a good deal of the content of that revolution with the intention of concentrating on those aspects which have the greatest bearing on psychological history.

Before we touch on the meeting of those two main streams of modern science and modern philosophy as "roots" of our traditions, it is important to remark that in this discussion we are dealing with their "fruit" as it is manifest in the life of one individual, Gustav Fechner. While that statement mostly serves to make the obvious explicit, it is also intended to open the way to an appreciation of the spirit of the times "Zeitgeist" as it is evidenced in Fechner's life and as it was manifest in the culture in general. Since the proper treatment of this all important topic would not only require more space than is available but would also take us from the study of psychology into the fields of history and literature, to say nothing of the author's inability to pursue such topics, we must be content with the barest intimation of the central content of the change as it relates to psychology.

That part of the great drama of man's unfolding nature as it is mirrored in the narrow aspects of the philosophy and science that we are considering, gives us an important clue to the character of the developments we are seeking. The author feels that it is highly significant that we find, in the last half of the nineteenth century the combined developments of: a) the meeting of modern philosophy and modern science, b) the birth of a new dimension in the awareness of man's nature; hence, the development of the scientific study of man and c) an organic change in the whole character of western thought.

Whitehead admirably recounts the major dynamics of these times which were animated by the impulse of great technological discovery and the excitement of new vistas in scientific theory. Of these times he remarks:

> Both the material and the spiritual bases of social life were in the process of transformation. When the century entered upon its last quarter, its three sources of inspiration, the romantic, the technological, and the scientific had done their work.
>
> Then almost suddenly, a pause occurred; and in its last twenty years the century closed as one of the dullest stages of thought since the time of the First Crusade. . . . The period was efficient, dull, and half-hearted. It celebrated the triumph of the professional man.[119]

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[119]Whitehead, Science and the Modern World, p. 101, emphasis added.

This then, is the context in which we find the development of modern psychology; it is a time carried on by a professional dynamic but also one which found the heart of its whole cosmology shaken to the core. We have seen something of the rise of the idea of the conservation of energy in earlier sections, and have appreciated the rather universal nature of the concept. Whitehead believes that the rise of this concept, that is, the ability to consider energy as a quality in its own right, was not only a challenge to the basic notion of mass (matter) in the old cosmology but actually succeeded in replacing it as a basic metaphysical category. In fact, Whitehead asserts that:

> Later on, we find the concepts of mass and energy _inverted_; so that mass now becomes the name for a quantity of energy considered in relation to some of its dynamical effects. This train of thought leads to the notion of energy being fundamental, thus displacing matter from that position.[120]

Thus far, we have touched upon the development of the concept of the conservation of energy in the work of Helmholtz, its creator, and we will now see its further elaboration as one of the key elements in the creation of the metaphysical fusion which lies at the heart of the development of psychological thought. The new foundation of physical reality which is evident in the transition to an _inverted_ concept of mass in which it simply " . . . becomes

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[120] _Ibid._, p. 102, emphasis added.

the name for a quantity of energy considered in relation to some of its dynamical effects," can also be seen as an important basis for the Whiteheadian alternative of organism as a replacement for matter. In this view, the identification of a basic happening (event, or elementary unit) avoids the old description involving matter with the fallacious property of simple location by substituting the notion that " . . . energy is merely the name for the quantitative aspect of a structure of happenings; in short, it depends on the notion of the functioning of an organism."[121] In this first superficial mention of the organismic alternative, it is important to note that one of the basic principles of that alternative includes the recognition that the happenings involved in _any_ phenomenon contain two fundamental aspects. That is to say, each event has an _intrinsic_ and an _extrinsic_ reality, the event is its own prehension and it is also the prehension of other events. There is, in fact, both a within and a without in nature that must be considered in any system that would aspire to understand reality. Detailed evidence for this view, which supplements that which Whitehead provides, will be given in later chapters. For the present, we will proceed on the assumption that the most developed aspects of contemporary science are harmonious with this interpretation and will therefore: a) feel

[121] _Ibid._, p. 102.

free to use these categories as basic criteria in structuring our further consideration of psychological thought and b) take great pleasure in noting that these same categories are to be found within the entire development of psychological thought. Thus, we do not consider that the rendition of psychology which is to follow is distorted by the imposition of abstract categories which bear a rather tangential relation to the actual animus of psychological thought. On the contrary, this treatment will allow the data to speak for themselves, as it were, and if therefore the resultant seems a distorted image of more familiar interpretations, we will be more comfortable in asserting that new "irresistible" operations of the interpretative Helmholtzian unconscious are required for the more adequate assimilation of the data presented rather than easily capitulating with an admission that the old frame of reference is equally efficacious in its disclosure of reality.

In closing this section, it is appropriate to remark that the events we are about to observe in history and in Fechner's life stand in the same relation of within to without that we have asserted is a primary characteristic of the new metaphysical basis for psychological, philosophical and scientific thought. That is to say, the twin strands of modern philosophical and modern scientific thought can be seen as the internal (within) reality of the unfolding drama of western man; they are the pattern of his collective existence which has translated across time. Now, when we come to their union (or better, re-union), in the life of Fechner, they become the extrinsic factors (without) which are relevant to the unfolding of the intrinsic (within) reality of his own prehension into the unity of a new creative synthesis of the various data which present themselves as relevant to that process. Whitehead calls this process "concrescence" and we mention it here, along with that which immediately preceeded it, in an effort to: a) indicate that it is the complete sentience of the whole individual which is most efficacious in the advancement of knowledge (an obvious statement if it were not for the second point) and b) to underline the fact that the only place novelty can be introduced into man's philosophical and scientific system is within that same sentient individual. Accordingly, it is to the understanding of that new novelty which was animating Fechner while apparently stultifying the wave of progress which had been founded upon the old notion of simply located matter, to which we now must turn.

3.0.1 GUSTAV FECHNER (1801-1887)

In considering the external aspects of philosophy and science which were united in Fechner's unique vision, we can begin with the clear-cut dualism which was first formulated by Descartes in 1650. As we have seen, this dualism was a main characteristic of the entire phase of British empiricism (Locke, Berkeley, Hume, Hartley, the Mills, and Bain, to name only those few that have been explicitly considered); Fechner repudiated this dualism and sought to defend spiritualism against materialism. In terms of the current scientific doctrines of the day, Fechner, who had become a professor of physics at an early age, was well grounded in all phases of science and mathematics. Particularly important to the development of his ideas were the modern understandings of the electrical nature of the nervous system and the newly developed principle of conservation of energy. These two concepts led to the natural conclusion that a system which simply conducts electrical energy (the nervous system) must also conserve energy, that is, it will not gain or lose energy in the transformations which take place between stimulation and sensation. From this it naturally followed that the greater the stimulus the greater should be the sensation. These basic relationships are central elements in Fechner's system.

To this brief account of Fechner's place in the history of philosophy and science, we should also add that he was a rather unusual and creative genius. He was a poet, a satirist and intimate friend of many important artists of his day, Mendelssohn and Schumann being two examples. He also, in the last decade of his life, attempted to found an experimental aesthetics. Perhaps one important aspect in shaping his theorizing was an unusual period of three years in which he suffered an extreme depression during which he not only resigned his professorship but also became a complete recluse. This period, 1839-1841, is credited with a lasting influence upon his outlook, his interest in religious thought and the true place of the soul in the scheme of things. His publications tell the tale: in 1851 came the Zendavesta, literally "the revealed word," which among other things, argued that consciousness is to be found in some degree in every created thing, and that the soul does not die. Earlier, in 1936 there was a book that concerned life after death in which he asserted that the true solution to the materialistic problems of the world was to be found in the affirmation of the spiritual principle that there was an identity between mind and matter and that an enlightened view point was one that held that the entire universe should be regarded as to its consciousness. He called this view "Tagesansicht" or daylight view and contrasted it with the materialistic assumption of inert matter which he labeled "Nachtansicht" or night time view. Needless to say, his assertions that things like plants possessed consciousness did not make him a popular figure in the more materialistic scientific centers.

Fechner considered himself as a philosopher with a mission to implant the idea that everything in the world could be viewed in two ways, as mind or matter, within or without, and his efforts to give expression to this view led directly to the creation of a new science--psychophysics. "While the knowledge of the material world has blossomed in the great development of the various branches of natural science and has benefited from exact principles and methods that assure it of successful progress," Fechner wrote in the Introduction to his Elements of Psychophysics, "and the knowledge of the mind has, at least up to a certain point, established for itself a solid basis in psychology and logic, knowledge of mind and matter, body and soul, has up to now remained merely a field for philosophical argument without solid foundation and without sure principles and methods for the progress of inquiry."[122]

Fechner based his search for sure principles and methods upon a basic set of truths "factual circumstances" which he felt opened the way to a solid foundation for scientific knowledge. First of all, the external world is known by the senses and given in experience such that we can know its external relationships, this knowledge being limited by the acuity of our sensory apparatus. He also

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[122]Gustav Fechner, Elements of Psychophysics, H. E. Adler, trans., D. H. Howes and E. G. Boring, eds. (New York: Holt, Reinhart and Winston, 1966), I, 1.

felt that we could have direct knowledge of our "inner world" by direct observation. This knowledge, too, was limited, but this time, it was the limitation of the mind rather than the senses which determined the precision of the knowledge. On this latter point he is, no doubt, referring to the new German physiological psychology of Herbart, Lotze and Helmholtz. Fechner's unique contribution was his further observation that while these two separate approaches could each give "basic facts, basic laws, and basic relationships" in their separate fields, there was no way in which those isolated efforts could actually describe the relationship between mind and body. These were separate areas of discourse in which "the situation was not the same," as when one attempts to understand the relationships between the material and mental worlds, because:

> each of these two inextricably associated fields enters into immediate experience only one at a time, while the other remains hidden.[123]

Here then, is Fechner's formulation of the internal/external, within/without relation to which point, because of its importance to our concerns, it is better to allow Fechner to speak for himself:

> At the moment when we are conscious of our feelings and thoughts, we are unable to

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[123] *Ibid.*, p. 1.

> perceive the activity of the brain that is associated with them and with which they are in turn associated--the material side is then hidden by the mental. Similarly, although we are able to examine the bodies of other people, animals and the whole of nature directly in anatomical, physiological, physical and chemical terms, we are not able to know anything directly about the minds that belong to the former nor of God who belongs to the latter, for the spiritual side is hidden by the material.[124]

Perhaps this formulation should be called the Fechner inclusion/exclusion principle of conscious awareness since in it he established that mental life includes physical life, but is not directly conscious of it--for the material side is hidden by the mental side; while, at the same time mental life is excluded from direct knowledge of the mental life of others by their physical bodies--the spiritual side is hidden by the material.

He attributed the confusion and argumentation which resulted from this limitation to the simple fact that the normal mode of observation of things was to see things in a cause-effect relationship which usually occurred contiguously in time. In the case of mind and body however, this was never true; in fact, in the absolute nature of this permanent exclusion, Fechner saw a fundamental truth that forever determined, for example, that when you stood inside a circle the convex side would be hidden by the concave

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[124] Ibid., p. 2.

side. However, since "both sides belong together as indivisibly as do the mental and material sides of man [they] can be looked upon as analogous to his inner and outer sides."[125] His intent, he stressed, was not to enter into dogmatic dicta regarding the metaphysics of the matter, on that score, he felt, everyone should seek his own answer; his concern was to build upon the simple observational fact of inclusion/exclusion. And so he did:

> The whole world . . . prove [s] to us that what is in fact one thing will appear as two from two points of view. . . . Who would not admit that it is always thus and cannot be otherwise? . . .
>
> What will appear to you as your mind from the internal standpoint, where you yourself are this mind, will on the other hand, appear from the outside point of view as the material basis of this mind. There is a difference whether one thinks with the brain or examines the brain of a thinking person. These activities appear quite different, but the standpoint is quite different too, for here one is an inner, the other is an outer point of view. [Thinking of the mind heightens the differences] for the twofold mode of appearance of the circle . . . was after all basically gained by taking two different external standpoints. . . . The appearance of the mind to itself, on the other hand, is gained from the truly inner point of view of the underlying being regarding itself, as in coincidence with itself, whereas the appearance of the material state belonging to it derives from a standpoint that is truly external, and not in coincidence.[126]

Before we turn to more specific issues within the psycho-

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[125] Ibid., p. 2.

[126] Ibid., p. 3.

physical formulation, there are two additional elements of the over-all programmatic proposal that should be mentioned.

First, his position on the unity of a "single thing."

> The natural sciences consistently employ the external standpoint, . . . the humanities are internal. The common opinions of everyday life are based on changes of the standpoints, and natural philosophy on the identity of what appears double from two standpoints. A theory of the relationship of mind to body will have to trace the relationship of the two modes of appearance of a single thing that is a unity.[127]

We will have more to say about the importance of the two modes of appearance in the next section, here we shall briefly nod to its significance and elaborate slightly with the second of the programmatic elements we are recounting.

> The whole of nature is a single continuous system of component parts acting on one another, within which various partial systems create, use, and transmit to each other kinetic energy of different forms, while obeying the general laws through which the connections are ruled and conserved. . . .
>
> We know, even without awareness of the special nature of psychophysical processes, what we have to understand by their magnitude, if we are clearly to relate psychophysics with physics, physiology, and everyday life, and we can base generally valid conclusions on the universal conditions and laws of kinetic energy.[128]

Clearly, Fechner's psychophysics are an example of the interpretation which Whitehead gave to the general

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[127] Ibid., p. 5, emphasis added.

[128] Ibid., p. 23.

metaphysical meaning of the transition from simply located matter to energy as the basis of scientific thought. Fechner's appreciation of the meaning of this change and the formulation which he gave to some of its consequences provided the key to the novel view he attained regarding the relation between mind and body and the proper approach to the study of that relation. To see this more clearly, we will need to explore the specific interaction of the principle of conservation of energy, the electrical nature of the nervous system, and the theory of sensations more carefully as they operate in the basic assumptions of the theory.

It is best to start with an explicit statement of Fechner's actual methodological strategy:

> To sum up, we may say that the production as well as the use of the kinetic energy of the psychophysical processes within us, as far as we can observe it or make deductions about it from our observations, obeys everywhere the same laws as kinetic energy of nonpsychophysiological activities within us and outside us. As free as the mind may be, it still cannot do anything contrary to this law, but only whatever is based on this law.[129]

From this, we see that Fechner needed to establish a quantitative identity between the mental and the physical effects of stimulation in order to give empirical justification for his theory. His problems, of course, were

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[129] Ibid., pp. 33-34.

nontrivial since he had to deal with the measurement of the mental products of sensation, a task which, before Fechner, was considered impossible, due to the fact that there was no way to measure the specific values of the actual inner energies deep in the nervous system. Fechner's solution to this dilemma proposed that even though it is impossible to measure the activity deep in the nervous system, it must, according to theory, be at least a dependent function of the external stimulus energy. With this assumption firmly in hand, Fechner took the next step by assuming that, if he could measure the magnitude of the mental effects and show that they were also a dependent function of the external stimulus energy then, he would have a method of demonstrating the quantitative identity between the mental and the physical. This quantitative identity, when established, was to have defined the fundamental facts and laws which pertain to the connection of outer to inner psychophysics.

> Even before the means are available to discover the nature of the processes of the body that stand in direct relation to our mental activities, we will nevertheless be able to determine to a certain degree the quantitative relationship between them. Sensation depends on stimulation; a stronger sensation depends on a stronger stimulus; the stimulus, however, causes sensation only via the intermediate action of some internal process of the body. To the extent that lawful relationships between sensation and stimulus can be found, they must include lawful relationships between the stimulus and this inner physical activity, which obey the same

> general laws of interaction of bodily processes and thereby give us a basis for drawing general conclusions about the nature of this inner activity.[130]

Before considering Fechner's method of measuring the magnitude of mental effects, the previously impossible task, it is important to underline, once again, the centrality of the concept of conservation of energy to formulation of the psychophysical system. Actually, Fechner's use of this principle stems directly from Helmholtz. "This is the great principle of the so-called conservation of energy," he wrote in granting Helmholtz his due,

> which, while related to the law of conservation of kinetic energy, is even more universal in importance. This principle, while founded on long-known general principles of mechanics, was first clearly developed by Helmholtz, who pointed out its full meaning and explained its most important applications. . . . Up to now no one has found reasons to doubt its general applicability in the areas of the organic and the inorganic.[131]

The one aspect of the kinetic energy principle which derives from the generality of the conservation of energy which has not been covered to this point, refers to its relation to the metabolic processes of the body. This energy which is a function of the body's general health and condition is seen to be subject to:

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[130] Ibid., p. 10.

[131] Ibid., p. 29.

> rather sudden redistributions, accomplished partially either through stimuli or through voluntary direction of attention or change of the field of activities.[132]

In terms of the physical relations within the body, this means that the energy which underlies "chopping of wood" or thinking are "not only quantitatively comparable but each can be transformed into the other." In this transformation, "partially [accomplished] either through stimuli or through voluntary direction of attention," are to be found the basis of the argument Fechner would have used against modern behavioristic stimulus-response theories. Fechner says:

> The idealist may trace the action of the stimuli to a mental reason, the materialist may attribute choice and attention to a material reason.

and then concludes with the position which comes naturally to someone utilizing a view espousing organismic relations rather than mechanical ones

> We, however, take the facts as they appear directly on observation, where at one time the material side (or mode of appearance), at another the mental sides provides the evidence for the changed distribution.[133]

Then, as if to answer the materialists once and for all, he concludes his chapter on kinetic energy with a statement that would have made Hume on his deathbed more serene, if not more humble;

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[132] Ibid., p. 35.

[133] Ibid., p. 37.

> . . . concerning freedom of the will. . . . By the explicit statement that the general laws of kinetic energy merely limit its free disposal in general [we have assumed that], freedom is given every right which it truly deserves. The law of conservation can neither dictate whether and how we transform potential energy into kinetic energy, nor whether and in what direction it should be transmitted. In this respect the will remains completely free within the limitations set by this law.[134]

In this, we find an extended and spiritualized version of Helmholtz's more cautious assertion against the vitalists, which we have already quoted to the effect that, since life processes produced mechanical and chemical effects, "their effects must be ruled by necessity . . . there cannot exist any arbitrary choice in the direction of their actions." Of course, the two men are talking about the same thing, and it is the difference in their points-of-view, external for Helmholtz and internal for Fechner, which therefore casts an entirely different light on the issue; actually, both are right since freedom is never arbitrary. We will also ultimately conclude that such "decided"conditions do not banish freedom but only qualify it. However, it should also be noted that the organismic alternative to which we will turn requires more than the simple assumption of an internal/external Fechnerian frame of reference. This condition will become more apparent at the beginning of the

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[134] Ibid., p. 37.

next section when the concept is formally introduced.

We must now treat the actual rationale for the psychophysical measurements which were to demonstrate the empirical validity of Fechner's theory. In this, we will have the opportunity of including the important and prior work of E. H. Weber and also, we will be able to form a bridge into the experimental psychology of W. Wundt.

Fechner, it will be recalled, needed to establish the functional relationship between stimulus intensity and the resultant intensity of the mental sensation. The obvious solution, that of applying just enough stimulation to produce a sensation, i.e., overcome the threshold value, yields only one point of correspondence between the two. Clearly, this is insufficient and Fechner's solution was an ingenious one. He established the "differential threshold" whose property it was to detect the difference between two stimuli. In this, he reasoned that it is always possible to state whether one stimulus is greater or less than another such that the "just noticeable difference" between the two can become a means of pinpointing the magnitude of the sensation that corresponds to the stimulus intensity.

Now, it is at this point that Fechner's treatment of the phenomena becomes heavily influenced by the requirements of the mathematics he was required to use. Fechner recognized the problems in this area and even included an appologia to both the nonmathematicians (those who would not understand) and to the mathematicians (those who would understand) in the introduction to his Elements of Psychophysics. These assumptions are, perhaps, the archetypal case of mathematical and statistical imperatives dictating the character of the treatment which is afforded to psychological phenomena. Certainly, the assumptions of "true score theory" in testing psychology and the assumptions, often violated, of the standard analysis of variance model in experimental psychology are but the modern variants of the assumptions which Fechner included in his measurement system.

Specifically, and briefly, he had to assume that both the scale of stimulus intensities and the resultant scale of sensation magnitude estimates had the properties of an interval scale. That is, that both scales had an absolute zero point and that the increments in the scale were equal to one another. In the case of the stimulus dimension this seemed a reasonable assumption; however, in the case of sensation magnitudes, this is a completely unsubstantiated assumption. In Fechner's words, we see the importance of this assumption:

> . . . the intensity of a single stimulus itself can be looked upon mathematically as the sum of positive increments starting with zero, . . . a sensation of difference can be looked upon mathematically as a positive or negative

> increment to one or the other sensation [therefore] . . . such would be looked upon as the sum of positive increments starting with [a difference of] zero. Now if the functional relationship between the sum of stimulus increments starting from zero and the sum of the related sensation increments is known, the problem resolves itself for every degree of the stimulus and the resulting sensation.[135]

At the conclusion of this consideration of Fechner's thought, we will be able to relate the above assumption to Freud's theory of the unconscious but for the present, we need to see that Fechner established the equal increments of his scale by assuming that the just noticeable differences of threshold he could detect were, in fact, the equal increments he required for his scale.

> In principle, then, our measure of sensation will consist of dividing every sensation into equal divisions (that is, equal increments), which serve to build it up from zero. The number of equal divisions we conceive is determined, like inches on a yardstick, by the number of corresponding variable stimulus increments that are capable of bringing about identical sensation increments.[136]

With this principle, firmly established as the correct approach, Fechner had the method he needed for the determination of the magnitude of the sensation:

> . . . we determine the magnitude of a sensation, which we cannot do directly, by asking how many times it contains the same unit, an

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[135] Ibid., p. 49.

[136] Ibid., p. 50.

> operation that we are able to perform directly, and read off the result not as a number of sensations but as the stimuli that determines the sensations and that are easier to read.[137]

E. H. Weber of whom Fechner said "in my opinion [he] should really be called the father of psychophysics,"[138] had already given a considerable amount of empirical support to the measurement of sensation magnitude. His true contribution lay, according to Fechner, in the fact that he gave an exact formulation which stated that:

> the magnitude of stimulus increment must increase in precise proportion to the stimulus already present, in order to bring about an equal increase in sensation.

Always one to show deference to his mentors, Fechner concluded, "I have therefore called it Weber's law." We should stress, at this point, that the principle of conservation of energy was an important factor in Fechner's willingness and security in the assumption that the stimulus and the sensation would covary. That the fundamental relation between the two was not a direct but a proportional covariation was not upsetting because Fechner believed that once methods were developed which could actually measure the translation of stimulus energy into kinetic energy, "or some other specific function of the underlying psychological

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[137] Ibid., p. 51.

[138] Ibid., p. 113.

processes," then, this would yield a law which "will take on for the field of mind-body relations just as general and fundamental a meaning as the law of gravitation in the field of celestial movement."[139] Can there be any doubt that Fechner's cosmological picture was only partially shifted from mechanism to organism? That he is still seeking an ultimate solution in terms of the Newtonian gravitational analogy is not only similar to the approach we have seen in many others but also reminds us of the situation with regard to another great pioneer in new vistas of thought, Nicholas Copernicus. Recall Koyré's assessment that it was enough for one man that he should have arrested the motion of the sphere of fixed stars, "to ask him to make it infinite was asking too much." In much the same way, we have in Fechner the pioneering spirit of a new view which recognizes in the "unity of every single thing" both a mental and a physical existence which is a part of the one continuous system of the whole of nature. Surely it would be asking too much to require him to see beyond the task of formulating the relationships of the two modes of experience into their natural implications for a reformulated cosmology similar to Whitehead's philosophy of organism. To continue the simile a bit further, we may say that just as Copernicus required the assistance of Giordano Bruno

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[139] Ibid., p. 37.

to make the universe infinite, we can find, for Fechner, a similar helpmate in the figure of Wilhelm Dilthey. We will touch on Dilthey at greater length in subsequent sections. Here, let us simply remark that if Fechner and Dilthey are equivalent to Copernicus and Bruno, the next figure we should expect on the scene is the psychological version of Galileo. Where is this Galileo of the psychic world? On this point we can lament with William James that:

> at present psychology is in the condition of physics before Galileo and the laws of motion, of chemistry before Lavoisier and the notion that mass is preserved in all reactions. The Galileo and the Lavoisier of psychology will be famous men indeed when they come. . . . Meanwhile the best way in which to facilitate their advent is to understand how great is the darkness in which we grope, and never to forget that the natural science assumptions with which we started are provisional and revisable things.[140]

Our position, as is obvious from the nature of our polemic, is that the natural science assumptions have yet to be seriously challenged. True, they have often been ignored as in most humanistic approaches but only at the price of losing the scientific status of the effort. Where is our Galileo?, we are not prepared to make a definite assertion but we are, however, prepared to categorically assert that when the true alternative is specified, it will involve a cosmology of hierarchical processes which is grounded in a transcendent

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[140]James, The Principles of Psychology (New York: World Publishing, 1892), I, 467.

purpose and which emphasizes the spiritual generality of man's being. The main thrust of this presentation is an effort to prove this Galilean assertion.

Since in this presentation we have referred to Fechner as the father of experimental psychology, we will conclude this section with a short summary of his lasting contributions to psychological thought.

First of all, it is accurate to say that it was Fechner that actually established the basis of psychology as an experimental science, an exact science which was modeled on physics. He accomplished this feat by the brilliant application of the new ideas of conservation of energy to the phenomena that had simply been a part of the physiological mechanism of the earlier German theorists. In so doing, he created a new way of looking at organic functioning and felt that it was the intricate energy exchanges in the system that made the various activities of "chopping wood" or "thinking" possible.

Another important aspect of his contribution was, of course, the elaboration which he gave to the doctrine of thresholds. We have seen this concept in other contexts, specifically Herbart and Weber, but it is Fechner's right to claim priority in elaborating the meaning of a scale of sensations which equated the absolute threshold of sensation with the mathematical zero point of sensory stimulation.

The final aspect of Fechner's contribution that we can touch on here is his relation to Freud's thinking. To go back a bit, we saw that Fechner equated the intensity of a stimulus, which started from zero intensity, with the intensity of a sensation, which was also seen as a continuum of sensations starting from zero (in this case, of course, it is zero sensation and not zero stimulation). Now one could look upon the following situation as a mathematical antifact but to Fechner, and ultimately Freud, there was real meaning in the fact that it is possible to measure stimulus values which are smaller than we can sense directly with our sensory apparatus. In these cases, Fechner's measurement formula yields a negative value for the sensation that should accompany the stimulation--negative sensation.

In his chapter on Thresholds in <u>Elements of Psychophysics</u>, Fechner asserts, that since it is possible to measure these small stimulus values without being able to sense them it is therefore possible to "refer to the threshold of a sensation . . . as well as to the threshold value of a stimulus."[141] This realization, rather than presenting a problem, is actually a central part of his system since he felt that:

> . . . psychophysics may be divided into an outer and an inner part, depending on whether consideration is focused on the relationship

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[141]Fechner, <u>Elements of Psychophysics</u>, p. 199.

> of the psychical to the body's external aspects, or on those internal functions *with* which the psychic are closely related.[142]

Also, "since the body's external world is functionally related to the mind only by the mediation of the body's internal world," the inner part of psychophysics which are unconscious must also conform to the same laws that regulate the external psychophysics.

> . . . since general higher phenomena of consciousness also have a point of expiration and a point of origination, we will be able to *generalize* the concept and expression of threshold to them. Examples of this type of phenomenon would be the level of total awareness with respect to sleeping and walking, the way single thoughts become conscious, and the focusing of attention in a given direction. In these instances we cannot speak of a threshold value of an external stimulus responsible for lifting consciousness above threshold. But the question may be raised whether we would not have to assume a threshold value of the underlying [inner] psychophysical processes and whether stimulus thresholds, . . . do not exist as far as sensations are concerned only to the extent that they can be translated into such processes.[143]

With this, we have the formulation of a dynamic unconscious which is also related to the outside world and sensitive to it. Not only is the analogy to Freud's unconscious compelling, it is also direct: Freud says:

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[142] *Ibid.*, p. 9, emphasis added.

[143] *Ibid.*, pp. 199-200.

> I was always open to the ideas of G. T. Fechner and have followed that thinker on many important points.[144]

Additionally, the notion of psychic energy is directly related to Fechner's application of the principle of conservation of energy to mental phenomena. And finally, "the role Freud assigned to the unconscious in The Interpretation of Dreams had its acknowledged source in Fechner's writings."[145]

Before moving on to Wundt and the subsequent development of psychological thought, we should summarize those aspects of Fechner's thought which were most neglected by his immediate contemporaries and a major portion of the main stream of psychological thought. Since we will develop these aspects more fully in subsequent sections it is important to highlight them here.

First of all, from our vantage point and the meaning which we ascribe to the development of the Helmholtzian concept of the conservation of energy, we have labeled Fechner as the first psychologist to explicitly recognize the major implication of that formulation. Whitehead asserts that conservation of energy had the effect of removing dead matter from the basic assumptions of scientific

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[144] Sigmund Freud, Autobiographical Study, quoted in Elements of Psychophysics, translator's preface, p. xix.

[145] Adler, in Elements of Psychophysics, p. xix.

metaphysics by replacing it with the concept of a quantity of energy which can only be considered in relation to its dynamical effects. He called this situation an "inversion" which places primary emphasis upon the quantitative aspect of a structure of happenings--"the notion of a functioning of an organism." Fechner's psychophysics can be seen as an exemplification of that new meaning since it represents the first attempt to formulate a scientific approach aimed at understanding both the internal and external reality of all things as being the two separate perspectives or modes of appearance "of a single thing which is a unity." Further, the unity he saw was not a restricted unity. Recall his statement:

> The whole of nature is a simple continuous system of component parts acting on each other, within which various partial systems create, use, and transmit to each other kinetic energy of various forms, while obeying the general laws through which the connections are ruled and conserved.

Another important aspect of this early organismic view is the stress Fechner placed on the associated doctrine that each individual unity can be regarded as to its internal or external aspects. In this, he departed from the past dualistic formulations of the mind-body relationship. We would assert, in line with the position taken in Chapter One, that it was Fechner's animating spiritual passion to know something of the mind of God and the minds of the other unities of nature whose "spiritual side [s] are hidden by the material [sides]," that formed the central determination of his day and night view of mental knowledge and material knowledge. As we have seen, the mental and the physical were important principles upon which he constructed the edifice of his psychophysics. The depth of his conviction on this account is amply shown by the place which he ascribed to the operation of free-will and the possibility of viewing the expenditure of kinetic energy by an individual as being the result of either internal or external control.

Fechner's goal was to describe the relation between mind and body in a scientific fashion. Key to his position was his conviction that minds alone had been studied for a long time as had bodies and matter. His insight was that their interrelation was occluded by the fact that focusing on mind hides the body while focusing on the body hides the mind. Further, knowing them separately is <u>not</u> equivalent to knowing them both in relation to each other. Natural science, he believed, focused mainly on the external aspects of phenomena, leaving to the humanities the task of studying the internal aspects of human life. Thus, to the knowledge we gain by the examination of the external world via our sensory apparatus, he wanted to add the knowledge we could gain by the direct observation of our inner experiences of mental life. That psychophysics could only deal with stimulation and sensation should not be allowed to obscure the fact that its role was to form the scientific basis upon which higher-order levels of understanding could be built. Clearly, Fechner accepted the highest levels of mental and spiritual life as well as the reality of the lowest levels of physical processes as being relevant to the true understanding of man. His labor was to bring the two together into a meaningful system.

Since we see in Fechner none of the British associationist philosophical psychology which had influenced Helmholtz and which will become important to Wundt, and precious little of Kantian nativism, it seems safe to assert that his vision was far more global than those we have considered to this point. Yet, it is the very expanse of his vision which provided his undoing at the hands of his successors. The world was simply not ready for a transition beyond the dominant and externally oriented world-view which characterized the atomism of physical science and the elementism of psychological science. Thus, the sophisticated methodological approach which Fechner had elaborated in an effort to measure the interface of the two great worlds of physical and mental, body and mind, external and internal phenomena, fell into the hands of those who were still trying to explain the world from the bottom up, as it were, and who could only see the task of psychological science in terms of its ability to emulate the successes of the physical sciences.

Therefore, in those who followed Fechner and formed the main stream of psychological thought, we will search in vain for greater insight into the issues of mind and body, free-will and the unity of the whole of nature. But treat them we must and so, it is to the nonspiritual experimentalism of Wilhelm Wundt that we must turn for the next major segment of our story.

3.0.2 WILHELM WUNDT (1832-1920)

First, let us start with the fact that Wundt was not a complete experimentalist. That is, from the very beginning of his published works he held the position that there were actually two psychologies. The one, which we know as experimental psychology and which focused upon the natural scientific approach of discovering the elementary contents of experience, was actually the one to which Wundt devoted most of his career, the other, which Wundt thought of as dealing with the higher mental processes, was called "Geschichte" or natural history of man, whose role it was to study the behavior of groups of men--a sort of social psychology. The important thing about this division, is that Wundt felt that:

> It is true that the attempt has frequently been made to investigate the complex functions

> of thought on the basis of mere introspection. These attempts, however, have always been unsuccessful. Individual consciousness is wholly incapable of giving a history of the development of human thought. . . . The problem of [Geschichte] relates to those mental products which are created by a community of human life and are, therefore, inexplicable in terms merely of individual consciousness, since they presuppose the reciprocal action of many.[146]

Aside from the utter falsehood of the main premise, if one accepts the validity of Piaget's genetic epistemology that is, we see that Wundt is making a sharp separation between the two psychologies. Even his vaunted method of introspection was unsuitable in the case of Folk psychology, as he also called it, since it is clear that such a study can never be experimental but only historical. This being the case, it seems quite natural that the entire stress which Fechner had placed upon the inner aspect of unified things would get lost in the shuffle, as it were, and receive almost no attention while, at the same time, those aspects of his experimental method which suited the experimental task of dealing with immediate sensations would receive great attention.

Wundt's system is known as the structural school of psychology because of its primary emphasis upon the generation of sensation by stimulation and on the interconnections

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[146] Wilhelm Wundt, Elements of Folk Psychology, E. L. Schaub, trans. (New York: Macmillan, 1916), p. 3.

in consciousness of the various sensations. Structuralism had a threefold impact upon the development of psychological thought.[147] First it helped via Fechner's psychophysical method to establish the experimental nature of psychology. Second, it provided a thorough test of the method of introspection which, incidentally, was imported to this country by E. B. Titchener in 1898. And third, its strong orthodox positions were good targets, especially in this country, for the alternative systems of psychology to react against. Behaviorism, functionalism and gestalt psychology all found a fertile field in which to plant the seeds of their criticisms.

Wundt, like Helmholtz and unlike Fechner, borrowed from the old system of British empiricism and took over the associationists mental mechanism almost completely. Again like Helmholtz, he fitted this together with the popular and more advanced German physiological mechanism. Obviously, these views are mutually congenial since they have a common derivation from Newtonian physics and therefore share the common goal of explaining how the simple, elementary sensations can be associated into a whole unified perception. Since we have already covered both of Wundt's primary sources in rather great detail we will not enter into a

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[147] M. H. Marx and W. A. Hillix, Systems and Theories in Psychology (New York: McGraw-Hill, 1963), p. 61.

thorough discussion of that background material. Instead, we will focus upon the new ways in which Wundt utilized those resources.

To begin with, it should be noted that Wundt did not succeed in actually creating his "Erfahrungswissenshaft" or "science of experience." In general, what he succeeded in establishing as the result of his experimental program, was to provide illustrations of the principles which supported his important systematic concepts and did not achieve an experimental proof of those concepts. Since what was known of the electrical nature of the nervous system indicated that only punctate elements of stimulation could be provided to the projection areas of the brain, Wundt's program was to analyze the components of experience which he knew to be physiologically given as elements. In this, unlike Fechner's unified entities, Wundt assumed that the mind and the body, because they belonged to two totally separate universes, could never be compared. His position on the matter is often known as psychophysical parallelism. In this view, physical and psychical processes are believed to be concurrent but not identical or even causally related. Because of this strict separation and also because of his focus upon the analyses of experience Wundt actually played down the role of the body and failed to grant it a very important role in behavior. Certainly this must have been part of the reason for Watson's subsequent frustration.

To elaborate on his commitment to the elements of consciousness we find Wundt generalizing his knowledge that the nervous system is composed of many interconnected elements:

> The principle of the connection of elements may be understood in an anatomical, a physiological and a psychological sense. Anatomically regarded, the nervous system is an unitary complex of numerous elements; . . . in more or less close connection with the others. . . . Physiologically, the principle of the connection of elements implies that every . . . [activity of the nervous system] is composed of a large number of elementary functions, the nature . . . of which we can never completely isolate from the given complex activity. . . . Lastly, there is a psychological . . . formulation of the principle. It means, psychologically, that . . . the facts of consciousness always presuppose as their physiological substrate, complex nerve processes, the result of the co-operation of many elementary parts. This complexity of the physical condition of elementary psychical facts manifests itself in . . . [the observation] that the psychical elements, simple sensations or simple feelings are always products of psychological abstraction, and never actually occur except in connections.[148]

For all of its sophistication, this statement adds very little to the content of John Locke's associationism. Of course, Wundt was also concerned with the means by which these elements were connected and the determination of the laws of their connection, as any good associationist would be. Accordingly, he found that the concepts of association

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[148] Wundt, Principles of Physiological Psychology, Edward B. Titchener, trans. (New York: Macmillan, 1904), I, 320-321, quoted in Lowry, op. cit., pp. 105-106.

by contiguity and association by similarity were adequate to describe the phenomena of consciousness. As might be expected, he was, therefore, forced to see all mental experience even "higher psychical processes" as simply a complex reordering, under the laws of association, of the various sensory elements which were the basis of mental life.

In earlier sections we have seen that British associationism had rather dried up on the vine, as it were, and it is interesting to inquire into Wundt's ability to plump it up again. There are two important and related factors. The one, which we have already mentioned, was the new impetus provided by the modern German physiological discoveries. The other was Wundt's addition of an experimental paradigm which based itself upon the analysis of immediate experience via the process of "Introspection." Since this process is often mentioned but seldom explained in any detail, we will mention it here in the context of its creation by Wundt.

Using the experimental method assured Wundt that he was creating a "Naturwissenschaft" or true science modeled after the image of physics. By using the method of introspection "Selbstbeobachtung" Wundt, sought to insure that the study focused upon the immediate experience of the subject. In this respect, psychological knowledge was seen to be different from physical knowledge because knowledge of the self as given in introspection was "immediate" or not mediated-direct, whereas, knowledge about something other than self must be mediate or involved with the character of that object and not pure "immediate" experience. In order to be useful for scientific purposes, introspection had to be carried out in a controlled laboratory environment under experimental conditions.

> All accurate observation implies that the object of observation (in this case the psychical process) can be held fast by the attention, and any changes it undergoes attentively followed. And this fixation implies . . . that the observed object is independent of the observer.[148]

This thesis, if one can go along with the assumption that the object is independent of the observer, was supported by the experimental method which created external conditions designed to produce specific mental processes and to make it possible for the observer to maintain a particular state of consciousness. In addition, the observer had to receive a great deal of training so that he would be able to separate the meaning which he naturally attributed to the sensation from the sensation itself so that he could identify the pure parameters of the sensation.

Before summarizing the over-all effect of structural psychology, there is one important point about Wundt's elementalism that should be underlined. Probably due to the static character of most British associationism as regards

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[148] Ibid., p. 107.

actual mental operations and also due to the highly structured impression one gets when thinking of the fact that psychic processes are directly resultant from the "physiological substrate," Wundt's system is often seen to have a static flavor in which the contents of consciousness have the same rigid character as the nerves from which they arise. However, it is not the case that Wundt felt strongly committed to a static view. "As a matter of fact," he stated, "ideas, like all other mental experiences, are not <u>objects</u>, but <u>processes</u>, <u>occurrences</u>."[149] We point this out as a caution for those times in future discussion, when the concept of process is introduced in the organismic context. From this example, it should be evident that the simple ascription of bare process to a phenomenon, actual or theoretical, whose main characteristics are seen as a reflection of the atomistic Newtonian metaphysics is not sufficient to guarantee an improvement in the explanatory power of the conceptual system. In fact, such half way attempts to instill the notion of process in any other than its rightful metaphysical milieu should be seriously questioned and carefully scrutinized so that the uncritical crossing of metaphysical contexts will become evident.

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[149] Wundt, <u>Human and Animal Psychology</u> (New York: Macmillan, 1894), p. 236, quoted in Marx and Hillix, <u>op</u>. <u>cit</u>., p. 63, Wundt's emphasis.

3.0.3 WUNDT, TITCHENER AND THE END OF STRUCTURAL PSYCHOLOGY

At this point, more for the sake of completeness than anything else, we can consider the net effect of Wundt, his main disciple E. B. Titchener in this country, and the whole school of Structural Psychology. This is possible primarily because the development of structural elementism largely came to an end with Titchener's death in 1927. Structuralism as a method always held firmly to the principle that its brand of introspection was the only way to study consciousness and its dogmatism on this matter was one of its main failings. True, it tried to cope with the obvious problems that arose from within like, for example, the fact that the observer in observing his own experience was also changing his experience. Or the fact that different introspectionists kept getting different results from similar experiments. However, the telling challenges came from without. For example, psychologists could produce many changes in animal behavior without any reference to "introspecting rats" and psychoanalysts were making great headway with their concepts of unconscious influences as important determinants of critical mental balances.

In addition to these criticisms, the rising tide of gestalt psychology which explicitly formulated the meaningfulness of the whole as opposed to elements of construction provided other important challenges. To further insure the final demise of the venerated tradition, there came the American functional school closely followed by the behaviorists. Functionalists could not see that the so-called elements of experience really made any important difference in anything--they truly seemed to have no function. And, of course, the behaviorists denied consciousness. But, interestingly enough, they did not simply deny the concept out of hand, they disproved it by applying the principle of conservation of energy. Thus, the final irony is that a doctrine, which at least in its German physiological half was inspired by the same man who had created the doctrine of conservation of energy, is now defeated by application of that same principle.[150]

In brief, the argument went like this. Since all energy in a physical system is theoretically accountable in physical terms, conscious processes would have to be viewed as either adding or substracting energy, or mass, if they are to affect the behavior of the body. But this sort of addition or substraction is just what the principle of conservation of energy denies. Now, here is where the behaviorist is often misunderstood in his criticisms of consciousness. What he is saying is that if you hold that

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[150]An excellent discussion of the various mind-body positions in relation to the doctrine of conservation of energy can be found in Marx and Hillix, Systems of Psychology, pp. 141-145.

ideas can, for example, move muscles, as we all would, then you must also restrict ideas to the same phenomenal level of the physical events in the nervous system. Ideas so restricted can be viewed as nonmental and restricted to operation within the physical system. On this account the behaviorist can, with some reason, assert that consciousness is a meaningless concept while also admitting that ideas, in his sense of the word, do in fact move muscles.

This account of the principle of conservation of energy is clearly a total refutation of the entire rationale of the introspectionist school and, by implication, the allied doctrines of mental and physiological mechanism. In this demise of structuralist psychology it is interesting to note that it seemed to succumb to the same general malaise that affected the physical sciences in the last half of the nineteenth century. That is to say, focusing upon the character of energy, as we have often asserted, has the effect of killing whatever explanatory vitality existed in the older material based views. Even Wundt's attempt at inserting process in place of static elements did not prevail against the more basic metaphysical challenge which is offered by the organismic nature of a dynamical quantity of energy.

In quite another context, in a subsequent section we will again have the opportunity to meet this behaviorist interpretation of conscious processes. For the present, we will simply remark that the strict physical interpretation of all mental phenomena as merely a description of the way physical events function was seen by the behaviorists as an excellent scientific refutation of the old system which ascribed to consciousness an independent status as unique experience. Further, it is also a corroboration of their own point-of-view. In this argument is also to be found the completion of the scientific banishment of the mind of man from the meaningful cosmos--a theme that seems to require no further elaboration now that the final proof is in.

3.1 THE COEXISTENT ALTERNATIVE TO EXPERIMENTAL PSYCHOLOGY

Up to this point, we have been considering approaches to the study of psychology which were heavily patterned after the mode of understanding which was provided by the natural sciences. Yet, as we are well aware today, there are many contemporary psychologists who do not feel that aspiring to create a psychology based on the natural scientific model is either desirable or possible. We have developed a rather extensive literature[151] which is a reaction

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[151] Critiques of psychological theory which are in line with the material presented here can be found in J. F. T. Bugental, The Search for Authenticity (New York: Holt, Reinhart and Winston, 1965), J. Lyons, Psychology and the Measure of Man (London: Free Press, 1963), and A. Vann Kaam, Existential Foundations of Psychology (Pittsburg: Duquesne Univ. Press, 1966).

to the perceived premature delimiting of psychological phenomena which is inherent in the psychology of earlier times.

Over and over, one hears the complaint that psychology lacks unity; direction; that its emulation of the physical sciences has prevented it from investigating meaningful phenomena; that those phenomena which it does investigate which also happen to have intrinsic meaning are, nevertheless, handled in an unmeaningful way; that the atomism of our methodology prevents recognition of the whole phenomena which rightfully belong to the human person. However, the problem does not stop there since the seeker of greater knowledge and understanding is soon swept up into a great divergence of opinion, fact and theory regarding the matter, once he ventures outside of the narrow confines of psychological science and seeks to find firm ground in any of the "more established" areas of discourse--scientific and philosophical.

One finds great argument over central issues like the role and nature of experience and interpretation in science.[152] The deep and aesthetic nature of the commitment which goes into scientific creativity is often composed with the fields of art, history, literature and music.[153]

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[152]F. S. C. Northrop, The Logic of the Sciences and the Humanities (New York: Macmillan, 1947).

[153]J. Bronowski, Science and Human Values (New York: Julian Messner, 1956).

The importance of the social nature of the scientific community has been admirably portrayed in singularly different ways by Michael Polanyi[154] and Thomas Kuhn.[155] Finally, great debates rage over such basic issues as the relation of scientific concepts to reality. The result has been a plethora of divergent views which seem jointly to demonstrate their paucity of philosophical content. Psychology has been rocked by the successive impacts of positivism,[156] operationism,[157] idealism[158] and finally, realism[159] arrives on the scene with something to say to each of the other positions and also something of its own to add.

Our ultimate position, following the process philosophy of Whitehead, will involve a realist epistemology which rejects, as we have seen, the positivism originating with Hume, and the idealism and a priorism due to Berkeley and Kant, in favor of the interpretation of personal experience

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[154] Michael Polanyi, Personal Knowledge (New York: Harper and Row, 1964).

[155] Thomas S. Kuhn, The Structure of Scientific Revolutions (Chicago: The University of Chicago Press, 1962).

[156] Karl Pearson, The Grammar of Science (New York: Macmillan, 1911).

[157] Percy Bridgman, The Logic of Modern Physics (New York: Macmillan, 1927).

[158] Arthur Eddington, The Philosophy of Physical Science (Cambridge: Cambridge University Press, 1949).

[159] Ernest Nagel, Structure of Science (New York: Harcourt Brace and World, 1961).

as a unity in intimate interaction with its environment. Whitehead, unlike the majority of those we have considered to this point, finds that the most basic aspect of our awareness of the world is that of being in a world as given in immediate experience such that it is erroneous to consider that it is necessary to construct what we know to be real. That is to say, it is our awareness of the world which arises out of our basic participation in the network of relations, including both the knower and the known in mutual interaction, which forms the basis for knowledge. The over-all position is called realism because it is a basic principle of the organismic cosmology that the world can only be understood by having reference to the existent beings with whom we are participating in the life of the cosmos.

Organism suggests process and process implies that events and not things are fundamental. Also, complete understanding of an organism involves understanding both its sides (internal and external). "We must start with the event as the ultimate unit of natural occurrence," Whitehead asserts, "an event has to do with all that there is, and in particular with all other events. . . . "

> There is . . . an intrinsic and an extrinsic reality of an event, namely, the event as in its own prehension, and the event as in the prehension of other events.[160]

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[160] Whitehead, Science and the Modern World, p. 103.

By now the theme of within and without, intrinsic and extrinsic is becoming more familiar, and we have hinted at it in those places where the character of history seemed most receptive to such an interpretation. Thus far, its grand master is Gustav Fechner and that is why we have chosen to label him as the father of psychology. Wundt, the prodigal son, attempted in his later years to develop his "Geschichte"; yet, was not successful in the attempt and did not, in any case, undertake to recant his original heresy of developing only the external part of Fechner's psychophysics.

This section is labeled a "coexistent alternative to experimental psychology" because, it is now possible for us to do two important things. On the one hand, we can apply the Whiteheadian assertion that what is most basic in the world is the wholeness of our immediate experience (its internal and external connectedness); while on the other hand, we can develop an important and often neglected aspect of the history of psychology which is highly relevant to our theme.

What we mean by applying Whitehead's basic assertion is this: since immediate experience is the totality of our awareness, scientific languages and theories are a selective abstraction from that total situation. Up to now we have dealt with many such selective aspects but have never been able to achieve their useful reintegration into a complete picture of man. We have also placed the problem squarely upon the mechanistic nature of the Newtonian cosmos and its simply located bits of matter. Additionally, by our mention of the indirect influences of cultural milieu and poetic insight we have tried to show that the wholeness of immediate experience does, in fact, contain factors which are excluded from, but none-the-less important to, the goal of meaningful scientific disclosure of reality. Therefore, in presenting the following history of psychological thought we can accomplish an important reality check on a key Whiteheadian assumption. If, as Whitehead asserts, immediate experience is the pristine pure mode of man's knowledge of reality, in this case his own psychological nature, why does it appear that the idea is unique to Whitehead? Surely other intelligent human beings must have come to a similar, if differently phrased, understanding. As is obvious from our rhetorical tone, and the title of this section, there is in fact a line of individuals, whose work bears a specific relation to psychology, that have recognized the same truth contained in Whitehead's assertion. For our purposes, we have begun with Fechner, though it is possible to go back well beyond him [to the Renaissance if desired], in locating the roots of the view.[161] This view can be called many things and for the present it is best to call it a humanistic view rather than an organismic one. This is because it is not until we get to the modern era and Whitehead's complete cosmology that we will find a clear unwavering apprehension of the basic cosmological change which is an important characteristic of the new era in which we live. Let us say, then, that we are now about to recount a history of psychology as a human science as opposed to psychology as a natural science.

3.1.1 WILHELM DILTHEY (1833-1911)

Dilthey was a contemporary of Herbart, Helmholtz, Fechner and Wundt, wrote extensively in psychology, but was primarily a philosopher with an eye to the broad aspects of nature and life. He published widely in the fields of literature, music, religion, history and, of course, psychology. His influence in psychology has been restricted not only by the fact that he was a philosopher and spoke the philosopher's tongue at a time when psychology was learning an entirely new language but also, and more importantly, because he saw psychology as a human rather than natural

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[161] H. D. Hodges, The Philosophy of Wilhelm Dilthey (London: Routledge and Kegan Paul Ltd., 1952), p. xiii.

I am indebted to Dr. Juan Caban of the U. Mass. School of Education Faculty for his insight into the sixteenth century thinker Gambiattista Vico and his relation to the approach which underlies this segment of psychological development.

science. It is this aspect of his basic approach that probably accounts for his invisibility in modern experimental psychology. We note with interest, that Boring's authoritative History of Experimental Psychology, which is a sort of "Old Testament" for the revealed word of modern positivistic psychology, neither mentions Dilthey in its index nor includes any reference to him among the copious chronicle of "begats" that are important to the spread of the seed of modern scientific psychology.

In entering into Dilthey's thought, we do not intend to provide even a sketch of his complete works. Our concern is to sample the character of his psychological thinking and to trace its influence into modern times. Dilthey, unlike those whom we have considered to this point, did not start his theorizing from a basis of mathematics and science but, rather, drew mostly upon inspiration from historical studies and aesthetics. Yet, his concern was to show that human science could be just as rigorous and systematic as the natural sciences but in a different way.

Dilthey believed, in line with the thesis we developed in our consideration of the early development of scientific thought, that one of the main attractions of the reliance upon mathematics and natural sciences was the fact that they offer an apparent method of obtaining not only exact knowledge but also ultimate control over nature. He was intimately familiar with the history and character of the centuries long traditions which led to the modern view and came to see that it really represented only half of the "globus intellectualis":

> the other half is composed of the study of man in society and in history. Here we meet with a different type of study. Instead of observing our object directly, we have to approach it indirectly through written testimony and other similar evidence; instead of clearly formulated theories which can be tested by experiment, we have an attempt to analyze and describe the concrete complexities of life; instead of explanation of particular events and processes through general laws, we have an appreciative understanding of the meaning and value of the unique individual. There is no reason why the one sphere of knowledge should not be as thoroughly studied by philosophers as the other.[162]

The above statement by Hodges, who is the main interpreter of Dilthey for the English speaking world, is meant to summarize Dilthey's main intentions. We can best relate these intentions to our approach by first taking a brief look at Dilthey's relation to philosophical thought and then focusing on the more detailed area of his psychological thought.

Since modern psychology had grown up with modern philosophy, Dilthey's over-all view shares an intimate relation to the aspects we have covered in earlier sections. Dilthey, like Helmholtz and Wundt was closer to the British

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[162] Ibid., pp. xiv-xv.

empirical philosophy which derived from Hume than he was to his direct German ancestry in Kant. There is, however, an important difference in Dilthey's approach as contrasted to either Hume or Helmholtz and Wundt. Seeing this difference is important to being able to accurately place Dilthey's efforts toward the creation of a human science of psychology in the scheme of things.

To digress a bit, we have been asserting that the basic characteristic of the rise of modern science is its adherence to and belief in the underlying validity of the basic metaphysical categories of time, causality, mind and matter. From an ever increasing reliance on the truth of these basic assumptions, the movement toward scientific explanation gradually elaborated an epistemology which was harmonious with those basic elements. This epistemology saw its methods of inquiry, its criteria of truth and defined the relation between the knower and the known in strict conformity to the dictates of the basic metaphysical imperative of the age. Now, before focusing on the major difference between Dilthey and his antecedents, it is important to discuss the more basic similarity that exists between them. This similarity also forms a common bond between all of the scientists, philosophers and psychologists that we have discussed; for that matter, it is also a major characteristic of many psychologists which remain to be discussed. We are referring to the basic metaphysical similarity that underlies the whole era of scientific development, especially that portion before the twentieth century when the basic categories of matter, energy, time, etc., were drastically revised. These underlying metaphysical assumptions were, as we have seen, generally rather tacitly assumed as the proper starting point for one's approach to philosophy, science and psychology. Out of these, were generated the epistemological systems which were to account for how knowledge was possible.

At this point we can return to our consideration of the differences between Dilthey and the others with the realization that the differences we are observing are epistemological rather than metaphysical. Dilthey, unlike Helmholtz and Wundt, did not accept the critical epistemology which characterized Hume. Hume's total metaphysical atomism had led him to the skeptical denial of causality, God and even self. He ended up with a picture of man's mind based on the association, through repetition, of the elements in the world which were given in experience. This is why Hume spent so much time on the nature of the mind and associationistic psychology. For Hume, mind was basic and natural science and even theology had to be based upon the logical and epistemological foundation that could only be provided by the science of the mind. We have also seen that this is the point of departure for Kant's divergence from Hume. Kant asserted that all knowledge, including psychological knowledge, is derived from more basic, a priori, relations which exist between the mind and its object. He was however willing to hold, with Hume, that "all our knowledge begins with experience" but he departed from Hume by asserting that "it does not [necessarily] follow that it arises out of experience." Instead, he asserted the requirement for the "faculty of knowledge to . . . supply from itself" the basic epistemological structure of the world.

The stage is now set for the introduction of Dilthey's psychological thought. Dilthey denied Kant's claim that the psychology of the mind was not basic to science and, while he therefore accepted Hume's position, he did not also accept his total skepticism. Hodges summarizes the multiple aspects of Dilthey's psychological position by recounting his position regarding the basic issue of epistemology.[163] Dilthey did not need an epistemology to convince him that he had knowledge because he already knew he had knowledge. In any case, epistemology itself has to presuppose the knowledge that there is such a thing as knowledge in order to have something to talk about. Similarly, he did not need an epistemology to tell him what the test of knowledge

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[163] Ibid., pp. 37-38.

or truth was because he, like everybody else, had learned the basic tests of knowledge in childhood and utilized them throughout life. Realizations of this type were the basic empirical facts that Dilthey felt should be handled by any psychological theory worthy of the name. He did not need an epistemology to tell him that the real world exists because the world is a fact of consciousness; if this were not the case, there would be nothing for epistemology to talk about. The questions which naturally arise about the nature of the real world should, he felt, be referred to the science of psychology for a close analysis of consciousness itself. Epistemology finally fitted into the picture only after the basic empirical facts of consciousness had prepared the foundation upon which its articulate superstructure could be built.

It is through this approach to psychology that Dilthey intended to prepare the way for a fruitful study of the other half of the "globus intellectualis." For Dilthey it was impossible to attempt to build an epistemology without laying its foundations in psychology, he saw that the only real question was whether one decided to do it consciously and therefore critically or pretend to do something else and therefore do it amateurishly. To claim independence from psychology is not so much as to free oneself from its bonds as it is to insure that they will actually become stronger. Dilthey says of one who attempts such efforts:

> he presupposes it. He makes use of it. But he does not control it.[164]

For Dilthey there were two main failings of the psychology of his day. First, was its inability to meaningly treat man's higher mental functions. Pronouncements about sensations and the association of simple ideas did not possess very much explanatory power from his point-of-view. He wanted a psychology which would at least be open to meaningful consideration of creative imagination, sense of values, religious devotion and poetic insight. At the heart of this criticism was his feeling that there is a reality of man's inner life (he called it instinctive) which is the actual basis of moral and spiritual life. To this inner aspect of man one must also add the outer or social aspects of life of which he is both a product and a source. In a statement that we will ultimately relate to an important principle in Whitehead's cosmology, the so-called ontological principle. Dilthey asserts that:

> Man as a fact prior to history and society is a fiction of genetic explanation; the man whom sound analytical science has for its object is the individual as an element in society.[165]

By way of contrast we will insert a statement of Whitehead's

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[164]Wilhelm Dilthey, Gesammelte Schriften, V, 149, quoted in Hodges, Philosophy of Dilthey, p. 38.

[165]Dilthey, quoted in Ibid., p. 40.

principle so that the similarity will be clear.

> The ontological principle asserts the relativity of decision; whereby every decision expresses the relation of the actual thing, for which a decision is made, to an actual thing by which that decision is made.[166]

In the present context, one should simply draw a parallel between Whitehead's use of "actual entity" and Dilthey's use of "man" as the basic unit of explanation. Dilthey's purpose is humanistic while Whitehead's is cosmological, and the difference between the two is the difference between metaphysics and epistemology. Dilthey simply reformed epistemology based upon the "basic empirical facts" of which he was naturally aware, but did not go beyond that point to a reformulation of metaphysics; the times simply were not right for it. By the time Whitehead was writing, half a century later, conditions were remarkably different. Thus, we find in Whitehead a new basis for the humanistic epistemology of Dilthey; and humanistic epistemology requires organismic metaphysics. But we do not have to become involved in intimate details at this point. Dilthey represents an important new view upon the scene and we should not occlude our appreciation of his historical importance with too many outside excursions. Until we come to Whitehead, "men" and "actual entities" will have to be synonymous.

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[166] Whitehead, Process and Reality, p. 56, Whitehead's emphasis.

We can make this equation because both writers use the same criterion of knowledge.

Whitehead's basic position was that:

> All human discourse which bases its claim to consideration on the truth of its statements must appeal to the facts. . . . The final court of appeal is intrinsic reasonableness.[167]

Dilthey wanted a psychology which recognized its basis in:

> The mighty reality of the content of mental life . . . [known in experience] which is consciously lived and originally given with immediate power.[168]

Whitehead said of his "actual entities" that:

> in separation from [them] . . . there is nothing, merely non entity--"The rest is silence."[169]

Dilthey could not have seen that only silence existed outside his epistemology because the old metaphysics was still there with its noisy hurrying and scurrying of elementary particles. He would however, and in fact did, feel that in relation to his epistemology the old points-of-view were nothing, merely non entities derived from partial consideration of the internal and external aspects of the individual and social nature of man.

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[167] Ibid., p. 52.

[168] Dilthey, quoted in Ibid., pp. 131-132.

[169] Whitehead, Process and Reality, p. 53, emphasis added.

To return to our consideration of Dilthey's criticisms of psychological thought, we find him putting his finger directly upon the pulse of materialistic metaphysics and the mechanist epistemology which it inspired in the earlier psychologists. Psychology, he felt, is mainly characterized by the uncertainty of its results, and he saw that this derived from the adoption of the method of physical sciences. Physical sciences had near certitude in the realities of mathematics and the assumptions of atomic physics which existed at the time. However, early psychologists, Hume is a good example, were led astray when they assumed that the procedures of physics were applicable to mental life. Accordingly, their attempts to reduce all varieties of mental life to the combinations and interactions of simply located sensations and ideas held together by the laws of association, created the problem of how to verify the psychological analogues of physical phenomena because of the basic differences in their natures. Physical science could progress because its basic elements are always open to direct experimentation and its exact measurements were separately repeatable by the community of scientists. Psychological science on the other hand, did not have such direct recourse to measurement. Even if elementary principles of the relation between mind and body can be experimentally derived, there is no corresponding method by which we can check the precision of the hypotheses we make about the higher-order phenomena of the mind. The possible hypotheses are many and experimental controls are not available.

Thus, in his criticisms of psychological theorizing, Dilthey recognized the limitations of materialist metaphysics and chose to supersede them by relying upon the phenomena of experience as he knew it. His problem in creating a psychology then, was to come up with a rigorous and systematic position which would rival the older systems without also having to assume the same limiting metaphysical basis. He published his answer to this problem in the year 1894 in a work titled <u>Ideas Concerning a Descriptive and Analytical Psychology</u>.

Dilthey's attempts to construct an alternative psychology were based on a premise that there are actually two kinds of science--descriptive and explanatory. Both, of course, had to start from a contemplation of the object of their efforts so that its natural and irreducible units could be obtained and so that the laws which express their interrelation would be evident. For Dilthey, a descriptive science was one which went beyond this point by building upon the units and laws which resulted from this analysis of actual experience. Explanatory science, on the other hand, is one which takes a prior stand on the proper units and laws which are appropriate to the phenomena and then proceeds to analyze the phenomena in terms of them. In this case, all that can arise upon these foundations is a hypothetical assumption. In Dilthey's eyes the classic example of an explanatory science was modern physics. Physics was restricted to the use of explanatory method because the data of human experience could provide no direct perception of the unity principle that applied to the phenomena. Therefore, physicists were required to "explain" the world of atoms in terms of the primary qualities which made that world appear meaningful. Dilthey recognized that this explanatory influence was evident in psychology and accordingly held that psychology should not start with explanations based on hypothetical units of sensations and feelings which "go behind the facts of experience" but, rather it should seek, in the data of inner perception, the principles of order which bring coherence to mental life. For his task only a descriptive approach will suffice.

Mental life, on this view, is an irreducible unity which is devoid of more fundamental units. Its natural unit is the total reaction of the whole self to the situation which confronts it. Rather than importing external elements of explanation like sensation, and feeling or even attempting more global, but ultimately just as limiting, constructs like intentional actions in which content is something separate, Dilthey's descriptive psychology was based upon an analysis of the whole self into three basic, mutually dependent and equally important elements. He says:

> The various types of relation [the cognitive, affective and conative attitudes of mind] stand to one another in a relation of cause and effect; one of them evokes the other. Images presented by the senses, or thoughts about them, give rise to feelings of satisfaction, of expansion of our personality and fulfillment of our being, and these in turn produce the effort and the resolve to maintain this state of things.

As he continues, recall the arguments of Hume and the empiricists; especially, the skepticism of Hume in which he came to doubt even the concept of his own self due to the fact that a rigorous application of the explanatory principles he utilized was incompatible with the phenomena he was explaining. Ask yourself which basis seems more applicable to naive experience. Returning to Dilthey's analysis, we have:

> This causal process, which leads from objective apprehension to feeling and from that to will and action, falls within inner experience. . . . The causation itself is consciously lived; if it were not consciously lived, then it would not find so direct and powerful expression in poetry and history. It is not that a regular sequence of particular states is given and their causal connection inferred, but the power of causation, the irrestibility with which an apprehended object sets all our feelings in tempestuous motion, the irrestibility with which a man, in spite of all reason, is as it were enchanted and constrained to snatch to himself the object of these feelings. . . . Only from the depths of lived experience can the strong impressions of these things be drawn--it is not from inferences that our knowledge of

> causation, which makes the true system of life accessible to us, has arisen.[170]

We have quoted at such length from the original because the heart of Dilthey's psychology is of such a fundamentally different character than anything we have considered to this point. We should also note that it is different still from the psychologies of Brentano and Husserl which we have yet to discuss. These later psychologies, which spawned modern phenomenological psychology, retain a more elementaristic flavor since they still seek explanations in terms of isolated "intentional acts" which have some "content."

Dilthey takes a giant step toward Whitehead's position in postulating the basic triumvirate of cognition, feeling and conation as the "ground-rhythm" of mental life. This is not to say that Whitehead uses those elements in that order, in fact he does not, but that is another story for another time. What is similar however, is the idea of a unit-reaction in which the basic elements always participate. For Dilthey, cognition comes first, then feeling and then conation. From the point-of-view of "lived experience" as the basic empirical fact for psychology to deal with the argument runs as follows: "I cannot cognize a thing without being interested in it and also having feelings or desires about it. I cannot feel unless I have an idea of the

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[170] Dilthey, in Lived Experience, Expression and Understanding, quoted in <u>Ibid</u>., p. 246.

object, and feeling tends to pass over into action. I cannot act unless I know the situation and my own aim, and action is usually motivated and always accompanied by feeling."[171] Dilthey refers to this shifting interrelationship as a "structural system." It is this structural system which makes possible a descriptive psychology as given in lived experience as against the explanatory systems which must rely on hypothetical inference.

Briefly, what this means to psychologists is that they should view conscious life as an activity (our complete activity) which is mostly directed toward other people and things in the world. That is to say, we do not usually focus attention upon ourselves--we cognize others and things and react to them. However, consciousness of other things is also accompanied by an awareness or "enjoyment" of our own mental processes and actions but this awareness is not explicitly presented to consciousness. As Dilthey would have it, we can only see ourselves out of the corner of our eye, as it where, and then only while our attention is focused on something else.[172]

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[171] Hodges, Philosophy of Dilthey, p. 43.

[172] Note the functional similarity of this view with Fechner's view that mind and body are not known simultaneously but, in fact, hide each other. Dilthey's position also has important relations to Polanyi's "tacit knowing" and Whitehead's split mode of perception.

When we direct the focus of our attention inward, Dilthey claims that what we observe is not the entirety of our mental structure but only fragments of it which are describable in terms of the basic structure of the three elements. Thus, the succession of events which we observe as "belonging together" do not require an associative bond between them which is based on the explanatory hypothesis of contiguity but are rather, related due to the fact that they are themselves successive elements which are part of the larger reaction pattern which is the unit of lived experience. To Dilthey, it was obvious that learning of a friend's death would bring sorrow as a natural consequence just as the suffering of injury or insult could lead to anger. This type of unity of patterned action, was seen in functional and teleological terms. That is, we know the link between the various segments of the experience because they are parts of the structural system within ourselves and from which we derive the idea of causality. These structural relations may be contrasted with the relations which are postulated by any view which relies upon the association of elements of consciousness as the basis of mental life. Recall also, Hume's criticism of the concept of causality as it applied to the material world. He could find no significance in the concept and concluded that the only thing we observe is the temporal relation between the cause and the effect. Hume became skeptical of everything and Kant tried to resolve the problem by providing that causality is an a-priori category of the mind. Dilthey would claim that they both failed because they are attempting to explain the successive stages of a single reaction-pattern by analogy to causal associations and mechanical habits between isolated mental constructs. In such cases we can, with Hume, Kant and anyone else who is utilizing an elementaristic epistemology as the basis of his thought, only infer an apparent cause-effect relationship to explain succession in time. This approach is completely without the ability to see any meaning or significance between the two events. It is rather like taking one critical focus on the mouth of a baby and another critical focus upon the baby's finger, and then wondering how the finger gets into the mouth without taking into account that both belong to the same baby. Dilthey's structural sequences by contrast, contain the meaning in themselves and it is our experience of this meaning from which the idea of causality is derived.

Dilthey's approach to the analysis of individual consciousness was balanced by an historically based view which he saw as able to give some insight into the early stages of the development of various human achievements which were now sunk deep into man's unconscious. He did not feel that introspection was the way to approach the study of the unconscious.

> What man is, he learns not by rummaging about in himself, nor yet by psychological experiments, but by means of history.[173]

Seeing the products of past lived experience, now stabilized by the objectivity of history, in light of the same structural system which applied to immediate experience, was to have provided an assurance that explanatory entities which were foreign to conscious life were not imported into the system from external sources. Similarly, Dilthey felt that if there were areas of understanding which were not adequately resolved in this manner, then it was permissible to develop hypotheses and explanatory investigations as long as the hypotheses are derived from the basis of the structural system itself.

Now that we have given some consideration to Dilthey's basic programmatic position, we can conclude our treatment of his psychology with a brief look at the main divisions he thought were appropriate to the framework of psychology.

As regards the divisions which were appropriate to a psychology which is based on the "structural system," Dilthey held that the first major division was the study of the structural system itself. This would provide a clearer understanding of the various elementary functions which go into the cognitive, affective and conative activity

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[173]Dilthey, quoted in Ibid., p. 45.

and also, it would yield information relating to the natural, teleological ends, toward which the conative behavior was directed. One of the strengths of this interpretation is that it focuses upon these ends as natural concomitants of the whole sequence which represent the subjective satisfaction of all the impulses which were involved in the unit-reaction. This is the inner awareness Dilthey spoke of as a natural concomitant to our consciousness of other things. His word for this was "Innewerden" which can be translated as "enjoyment" of those mental states, processes, and activities which accompany all consciousness but which are actually below the explicit threshold of consciousness in the sense that we mobilize them and utilize them for the process of attending to the focal aspects of our conscious lives. Again, for Dilthey, the ends toward which the whole system drives must only be interpreted in terms of the evidence of consciousness itself. Attempting to equate this understanding with a hypothesis from biology regarding the preservation of the individual and species is to distort the argument's structural image of the consciousness of man. This aspect relates directly to the second major division of Dilthey's psychology. Here, the laws of development would be studied with an eye toward defining how the "acquired system" of man's conscious life has been developed and also how that system functions in influencing future events. Dilthey thought that poets and novelists had developed the greatest insight into these areas and that psychology needed to develop its own characterization of these phenomena based upon the structural system.

Important ingredients in Dilthey's observations on the development of a new human scientific psychology were the natural facts with which psychology should explicitly deal. For example, he saw that the common mental structure and the common external world which was shared by all men led to similar fundamental presuppositions about the world and about behavior, i.e., personal obligation, cooperation, obedience, etc. This was the natural starting point for a truly psychological epistemology. From this position he saw that the processes of human development which lead to the mature individual were not quantitatively different between human beings but qualitatively different in the sense that all development involves the same elementary capacities which constitute human nature. The great variations in qualitative development were seen as the joint product of physical environment, social environment and the inherent capacity of the individual.

In summarizing the psychology which results from this approach, we see two important conceptualizations which Dilthey has added to the development of psychological thought. First, was his assertion that mental processes are predominately purposive or structural and that they tend toward the building of an integrated mind and character. He held that the elements of cognition, feeling and conation were always present though their mutual importance would vary with circumstances. The second important addition which is truly unique up to this point is the fact that he developed a highly empirical epistemology without also having to create an associationist psychology in order to explain mental processes and life experience.

Dilthey's own words place the appropriate stress upon the character of his basic contributions to psychological science.

> All knowledge is knowledge of experience; but the original unity of all experience and its resulting validity are conditioned by the factors which mold the consciousness within which it arises, i.e., by the whole of our nature. . . . In the veins of the knowing subject constructed by Locke, Hume, and Kant runs no real blood, but the diluted fluid of reason in the sense of mere thought-activity. But I was led, by my concern as historian and psychologist with the whole man, to make this whole man, in the full diversity of his powers, his willing, feeling, thinking being, the foundation for explaining even knowledge and its concepts (such as those of the external world, time, substance, cause), however much it may seem that knowledge weaves these concepts only from the material of perception, imagination and thought.[174]

For Dilthey the important elements in the way we picture and structure the reality of the external world, the

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[174] Dilthey, quoted in Ibid., pp. 113-114.

existence of life in others and our interactions with them, can only be explained in terms of the whole nature of man in which volition, feeling, and thought are seen as simply different sides of a single real-life process. Man's aim, he felt, was to act and the true character of that action should always be guarded by a psychology which protects the inner nature of man, "which ought to be sacred to us" from the "rashly experimental hand" of explanatory science.

3.1.2 FRANZ BRENTANO (1838-1917)

In Brentano we have another psychologist and philosopher who was actively concerned about the application of the methods of natural science to the "sciences of the mind." In fact, Brentano was also concerned about the applicability of the same inductive approach to science that we have seen Whitehead criticize. A. C. Rancurello who has recently translated Brentano's Psychology from an Empirical Standpoint into English also has documented the approaches and attitudes which Brentano felt were deterimental to the sciences of the mind and points to their modern relevance.[175] Brentano felt that: a) the adherence to the cannons of scientific methodology was an easy way to mask the inner lack of "all earnestness" in the actual conduct of research, b) there was a "dilettante encroachment" upon the sciences

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[175] Antos C. Rancurello, A Study of Franz Brentano (New York: Academic Press, 1968), p. 24.

of the mind by the experts in natural science, c) it was a vain effort to attempt to give meaning to the sciences of the mind by simply exerpting principles of explanation from the natural sciences, d) the failure to recognize that "the boundaries between formal learning and scientific and artistic tact" cannot be ignored and e) the "logical unknowledge" of the true nature and foundation of the inductive process which is usually found in those who practice the scientific method.

Given this type of approach at a time when psychology was trying so hard to become a science it seems strange that Brentano was recognized as a psychologist or that he had a very wide influence. Yet on both accounts he seems to have succeeded very well.

Brentano, the man, is interesting because at heart he was really a philosopher rather than a scientist and in psychology he was an empiricist rather than an experimentalist. Because of his training as a priest (a position he resigned because he was unable to accept the doctrine of Papal infallibility) he had an extensive background in philosophy and religion which greatly influenced the character of his contribution to psychology.

In historical perspective, we find Brentano's influence attenuated by the fact that in the separation which occurred between philosophy and psychology at the beginning of the twentieth century, there turned out to be little room for doctrines which viewed the relation of mental phenomena and mental contents from the perspective of both psychology and philosophy. Philosophers, for their part, were disregarding the old psychologically based view of logic and were turning instead to principles of logic which were independent of the way a person thinks. This shift marks the beginning of the development of linguistic analysis in philosophy and also the analysis of language itself which has become a major characteristic of modern American philosophy. Of course, psychology had taken the other fork at the crossroad and was about the business of eliminating philosophical issues as sources of its experimental approaches to research topics.

The separation which occurred between psychology and philosophy also had another important effect. Once the two were sufficiently separated it was possible for each to ascribe to the other any problems which seemed unsuitable in terms of the basic assumptions of the discipline. Philosophers came to increasingly assert that the nature of the mind is a factual problem which the psychologists should investigate experimentally; while the psychologists, for their part, were unwilling and also unable, because of their methodology, to tackle problems that did not fit the direct mold of the basic assumptions they had borrowed from the physical sciences. Thus, psychologists quite easily formed the counter assertion that the nature of the mind was really a problem for the <u>philosophers</u> and philosophical analysis. Seen in this light, both modern science and modern philosophy have ignored the direct study of the mind of man in favor of radically reduced views of human existence which focused upon highly abstractive explanatory principles.

Brentano is difficult to place in any particular psychological context because he stood upon the threshold of that transition to de-psychologized philosophy and de-philosophized psychology. In the middle of this transition we find Brentano with a stake in both camps, claiming that the mind should be understood in terms of the intentional relations which always exist between the mind and its object of contemplation. Mental events, for Brentano were really mental acts or processes in which it is not the content but the process that is important. Thus, if we see or hear something, the truly mental act is seeing or hearing and not the object or its physiologically based sensation.

"My position in psychology," he claimed, "is that of empiricism":

> experience alone is my teacher: but along with others I am of the opinion that such a position is quite compatible with a certain

idealistic viewpoint.[176]

As we elaborate Brentano's psychology a little further, it will be seen that he retains a basic elementaristic view toward psychic phenomena. He defined psychology as the "science of psychical appearances" but went on to specify that the purpose of his "descriptive psychology" was to:

> . . . show forth the totality of psychic elements, the combination of which makes up all psychic phenomena, in the same sense in which the letters of the alphabet make up all the words.[177]

Brentano's insight, as we have said, was that the psychic phenomena which result from such combinations of letter-like elements was the act of presentation and not the contents of the act. To achieve this separation Brentano specified that there are two classes of things. One was simple sensa like colors and tones--things or qualities input by the senses and the other was simple acts. Simple acts were things like the seeing of colors, the hearing of tones or the feeling of heat, etc. But in addition to these, and in order to account for higher mental phenomena, Brentano also specified that there were psychic acts which corresponded to judging and remembering and also to such things as

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[176]Franz Brentano, Psychology from an Empirical Standpoint, p. 1, quoted in John J. Sullivan, Franz Brentano and the Problem of Intentionality in Benjamin J. Wolman, ed., Historical Roots of Contemporary Psychology (New York: Harper and Row, 1968), p. 250.

[177]Ibid., p. 254.

emotions. In short, he developed an inventory of psychic acts which had three basic categories: presenting, judging and emoting. It was from these basic categories that Brentano sought to describe mental activities.

One of the first characteristics which he ascribed to the psychic phenomena was a rather curious quality known as "intentional inexistence." What he was attempting to do with this concept was to explain the ambiguous relation that existed between basic psychic phenomena and the various objects with which they could be associated. Each act had an object but the objects varied markedly, ranging from physical things to imaginary objects. Thus, Brentano asserted that:

> Every [psychic phenomenon] contains something as its object, but not every psychic phenomenon does so in the same manner. In presentation something is presented; in judgement something is affirmed or denied; in love something is loved; in hate something is hated . . . and so on.
>
> This intentional inexistence is exclusively characteristic of mental phenomena. No physical phenomena manifests anything similar. Thus, we can define mental phenomena as include an object intentionally within themselves.[178]

In formulating the concept in this way Brentano was very close to the long-standing dualism of mind and matter that is usually present in scientific psychology. His formulation was, however, different in the sense that he

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[178] Ibid., pp. 256-257.

distinguished between act and intention and not mind and matter. Sullivan observes that this distinction has a very important property.[179] First of all it establishes the traditional two-level world of physical phenomena and mental phenomena. But beyond that, there is the fact that the classical distinction of form and matter refers only to physical phenomena whereas, the act-intention formulation applies only to mental phenomena and not physical phenomena. To speak of act-physical or matter-mental is nonsense according to the logic of the system.

Important ramifications of this condition are found in several areas of modern psychology. For example, the Gestalt tradition of the relation of wholes and parts is a theory which relates the physical world and psychophysical properties and does not produce theoretical statements which relate directly to the character of perceptual processes. Speaking of this relation, which is known in Gestalt theory as "isomorphism," Wolfgang Kohler stated:

> . . . actual perception is in every case related by real structural properties to the psychophysical processes (phenomenal and physical) that belong to it; the union is not left to chance: it is subject to laws.[180]

Thus, it is theoretically inappropriate for someone to

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[179] Ibid., pp. 257-258.

[180] Wolfgang Kohler, On Isomorphism, quoted in Richard J. Hernstein and Edwin G. Boring, A Source Book in the History of Psychology (Cambridge: Harvard University Press, 1965), p. 264.

attribute the Gestalt notion of a whole to a perceptual process since according to the theory wholes ultimately derive from the structural psychophysical processes and the outside world. We should also add that "outside world" in this case refers to all events which have anything to do with the material world. This includes, of course, the psychophysical processes of one's own body such that only conscious phenomena (phenomenal qualities) may, on this basis, be viewed as the mental counterparts of the psychophysical Gestalt qualities.

In the same vein, we can observe that in reinforcement theory, the laws of reinforcement are simply relations between the stimulus operations in the physical world and their corresponding responses also in the physical world. Thus the generality of any reinforcement situation must always be restricted to a class of behavior and the reinforcement operations appropriate to it to which it is related by the "laws of reinforcement."

In both these examples, as we have said, the theories are restricted to the physical world and can only formulate a form-matter distinction between their theoretical terms. The act-intention relation we are considering with Brentano is however, not of this type. Act-intention is strictly limited to the logical and linguistic domain and is not a theory which derives basically from a prior position relating to either the phenomenal or physical domains. This distinction is important because Brentano's influence is primarily felt in the tradition we have labeled psychology as a human science and is one of the reasons why the two psychologies have been so difficult to bring together. At this beginning level of distinction between the two, we have the contrast portrayed in its clearest form. Brentano's system is organized around the psychical act whereas Wundt's system was based upon sensory contents. Since both men were contemporaries there was, as one would expect, great controversy between the "Act" psychologists and the "Content" psychologists. Of course, the "content" school is the one which operated within an experimental paradigm and the "act" school focused upon the description of pure consciousness by immanent inspection. This basic emphasis is responsible for the development of the very influential school of "Phenomenology" which is rather closely associated with the human scientific trend in psychology.

One important aspect of this sort of psychological development is the fact that Brentano, and as we have seen, Dilthey both thought that their psychologies were empirical yet neither was experimental. We often equate the two by thinking that the only way to be empirical is to be experimental. Yet, it is that very experimental approach that we have also seen is the primary reason why modern American psychology was created in the image of the physical sciences as opposed to the human sciences. It is obvious however, that being empirical in the sense of Dilthey and Brentano does not require one to reject the experimental approach out of hand. Actually, both men had respect for experimentation as long as it could operate within the larger explanatory context of their empirical psychology.

As we have said, Brentano, though he focused on mental phenomena as empirical facts, retained a much more elementaristic approach than Dilthey did. Thus, Brentano's psychology is actually closer to the basic metaphysical assumptions of standard physical and psychological science than were those of Dilthey's psychology. Perhaps this is one of the reasons why Brentano became a more direct influence in the subsequent development of psychological thought. In the present context, the important distinction that we must form is that the basic characteristic which underlies the separation of the natural and human scientific approaches to psychology is that the human scientific must: a) study characteristically human phenomena in a rigorous but human way; this means recognizing the presence of mind, b) recognize that mental phenomena have an empirical validity which is given in immediate experience, c) recognize that mental phenomena are not directly reducible to physical or physiological or psychophysical processes and d) recognize that mental phenomena have a basic intentional character in that they always have directedness toward an object.

3.1.3 EXTENSIONS OF DILTHEY AND BRENTANO IN PRESENT PSYCHOLOGY

The purpose of this section is to briefly consider the historical importance of the human scientific alternative we have found in Dilthey and Brentano so that its influence will become clearer. In tracing this history, we will find a continuity of development which moves away from a psychology that consists entirely of content and toward one that is based on psychical functions.

We have seen that the development of psychological thought in nineteenth century Germany was primarily characterized by a heavy reliance upon physiological mechanism and experimental techniques. Wilhelm Wundt as the champion of this view believed that introspection was the method by which the mind could be observed and analyzed. Psychologists of this era also explicitly separated mind from matter. Given this separation and the belief that the mind should have the same structure as the physical world, introspection became a tool for the analysis of consciousness that sought to reduce it to elementary sensations and elementary ideas.

The view which we have characterized as the human scientific alternative to such elementaristic approaches held that the only appropriate way to observe truly conscious phenomena was as they were given in immediate experience. This view, it should be added, does not necessarily require that one give up dualism as a description of mind and body. This is particularly noticeable in Dilthey and we have asserted that one must change the basic metaphysical assumptions of scientific description before a meaningful alternative to dualism can be found.

The alternative movement was arguing simply that the analysis of consciousness into elements via the method of introspection destroyed the true nature of the phenomenon since consciousness is essentially a unitary thing that consists of functions or acts and not sensations and images.

An important aspect of the shift to functions or acts of a unitary consciousness was the dynamic character it imparted to psychology. Wundt and the associationists had only been able to describe a passive mind which weakly reacted to sensory stimuli. Conscious functions and acts, on the other hand, gave the mind an active role in perceiving, judging and feeling. The old doctrine of associationism, which we have traced through two centuries of development, lost out as a fundamental description of mental phenomena once the mind was endowed with the power to act.

Others who can be viewed to have at least partially ascribed to this position are William James, James Ward, Edmund Husserl, Edward Spranger, William McDougall, and finally many more modern psychologists like Donald Snygg, R. B. McLeod and Gordon Allport. We will touch on key aspects of most of these men as we recount the development of this type of psychology. Obviously there are many important names which are left out; however, this simply is not the place or time to dwell exclusively upon history and of those we do cover we shall only be able to show the barest elements of similarity to the new alternative.

Following upon Brentano's work, there was a growing importance to the study of the phenomena of the mind. In 1900 Edmund Husserl greatly popularized the movement and succeeded in establishing "Phenomenology" as a method of psychology which sought to describe pure consciousness by a process he called "immanent inspection." There were also many others in Germany who, around the turn of the century, were deciding that the new psychology had a lot to offer and was, in fact, closer to reality than Wundt had been. Specifically, Carl Stumpf (1848-1936) who was a major competitor of Wundt showed the characteristic human scientific approach when he held that the proper way to study the perception of auditory tones was not, as Wundt would do, to employ trained introspectionists who were supposed to introspect the pure sensation of the tone, but to use expert musicians. Stumpf, like Dilthey thought of phenomenology as a basic science out of which all other sciences could be derived. It is interesting to noto that three of his students became quite famous by founding Gestalt psychology (Wertheimer, Kohler and Koffka). Also Kurt Lewin (who we shall consider in a later section), an important field theorist, was one of Stumpf's students.

An interesting aspect of Stumpf's work was his attempt to show that mental acts or functions and their contents could independently vary. For example in observing a color, the mental function can change from noticing to judging while the content of the color remains the same. Of course, the content could change while the mental act remains the same. In this we can see part of the reason for the demise of Wundt's introspective structuralism. Wundt was constrained to see only sensations and to explain these only in terms of the physical dimensions of the stimulus. Those who were considering higher-order perceptual processes found characteristics that could not meaningly be reduced to the qualities of sensation.

Max Wertheimer launched Gestalt psychology in 1912 with an observation similar to but far more conclusive than Stumpf's had been. Wertheimer was able to show that motion could be perceived when there was no motion in the stimulus. This finding which was both experimental and easily replicable made it clear that there were types of experience which could not be reduced to Wundt's elementary visual sensations. Certainly, this type of development was an important confirmation of the basic trends of the phenomenological movement.

We should note however, that Gestalt psychology is only partially in the camp with phenomenology. The Gestalt approach focused primarily upon the mechanisms of perception and generally sought to explain territory, which had previously been explored, by adding interpretations in terms of their own methodology. Others who were part of the movement away from elementism stayed much closer to the basic view point of intentionality as a key factor in mental phenomena.

William James (1842-1910) is a good example of the intentional trend. James' own colorful words are the best indicators of the reaction which had developed against the old school:

> Within a few years what one may call a microscopic psychology has arisen in Germany, carried on by experimental methods, asking of course every moment for introspective data, but eliminating their uncertainty by operating on a large scale and taking statistical means. Their method taxes patience to the utmost, and could hardly have arisen in a country whose natives could be bored. . . . The mind must submit to a regular seige in which minute advantages gained night and day by the forces that hem her in must sum themselves up at last into her overthrow.[181]

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[181] James, The Principles of Psychology, I, 192, James' emphasis.

James usually spoke of purposivism rather than intentionality but the meaning is much the same. In the German original the main connotation is process or action whereas in the American version there is, in addition to the action-oriented flavor, a definite indication of purpose; Americans seemed to require processes that did something useful also. So James' psychology is characterized by a purposive approach to mental phenomena which were a continuous "stream of consciousness."

> The pursuance of future ends and the choice of means for their attainment are thus the mark and criterion of the presence of mentality in a phenomenon. We all use this test to discriminate between an intelligent and a mechanical performance.[182]

James' "stream of consciousness" has much the same derivation as Dilthey's empirical structural system. James observed that the main characteristics of consciousness were its individualistic nature (it belongs only to single individuals); its ever changing nature (stream); its continuity of personal identity (in spite of lapses in consciousness as in sleep, etc.) and its selective or attentional character which belongs to purposiveness.

Another individual who belongs to this line of theorists is Edward Spranger (1882-1963). Spranger is interesting because he was successor to Dilthey at the University

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[182]*Ibid.*, p. 8.

of Berlin and also strongly influenced by him. Spranger, like Dilthey, took his departure from cultural rather than physical sciences.[183] His Psychology is sometimes known as "Understanding Psychology" because he sought to explain the interrelations between meaningful aspects of the inner lives of individuals. He also recognized that the individual's subjective experiences were interwoven with the events of the social and historical world. This view led him to deny purely subjective states and to focus upon consciousness as it relates to objective reality. With reasoning reminiscent of Dilthey's approach, he considered that the objective reality of mental relations is assured by the fact that: a) mental relations are attached to physical forms and can either receive value from the world or give it to the world--as in art forms, b) mental relations are developed in interaction with many single subjects such that they are collectively determined forms of meaning relationships and c) mental relations are seen as objective precisely because they have a supra-individual validity which seem to function as the norms by which the individual creates some mental fact.

In this approach which emphasizes an explanation of objectivity in terms of the activity of the knowing mind,

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[183] Edward Spranger, Types of Men, J. P. W. Pigors, trans. (Halle: Niemeyer Publishing, 1928).

Spranger felt that he had solved the age-old mind-body problem; and also had formulated an explanation of why the natural scientific approach should be avoided. In this case, Spranger held that the so-called objective world or external nature to which elementaristic psychology was attempting to relate its basic sensations, was, in fact, nothing more than a correlate of a special cognitive attitude. Since he placed such emphasis upon interrelations as opposed to elements Spranger, like Dilthey, thought of his psychology as a "Structural Psychology."

Spranger also developed a typology of personality types which was a strong influence in Gordon Allport's work and led directly to the famous Allport-Vernon Study of Values Test, 1931.[184] Allport used the six fundamental types of subjective evaluation which Spranger had developed as the basis of his rationale. It is interesting to note that the actual scales on the test instrument--theoretic, economic, aesthetic, social, political and religious--derive from Spranger's analysis which he carried on in the tradition of human scientific theorizing. It is unfortunate indeed that the underlying philosophical differences between the tradition to which Spranger belongs and the more elementaristic and behavioral traditions so prevalent in this

[184] Marx and Hillix, <u>Systems and Theories in Psychology</u>, p. 426.

country are not more clearly understood and more widely publicized. If this were the case, it is doubtful that the various "trait slices" of human personality would have been so proliferated in modern psychology. Since our American psychology is so anti-philosophical, the tendency has been to turn to techniques for "construct validation" as a means of compensating for the lack of a clearly established philosophical basis.[185]

In addition to the influences between German and American thought that we have been tracing, there was also an influence that came from England. Two names are important to this phase of development, James Ward (1843-1925) and William McDougall (1871-1938).

Ward was primarily a philosopher but wrote extensively in psychology. He, like his contemporary Brentano, did not adhere to the older views of a passive associationistic mind. Ward's basic premise is, however, different than the German approach in that he held an evolutionary view of consciousness in which mental processes were seen to have evolved from indifferentialed mentality. For Ward an elementary sensation was simply an erroneous abstraction because even at its first appearance in psychic life one must consider that a sensation is really a modification of a

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[185]Lee J. Cronbach and Paul E. Meehl, "Construct Validity in Psychological Tests," Psychological Bulletin, LII (1955), 281-302.

pre-existing presentation and that it is also true that the resultant whole presentation is more complex than it was before. Further, in this complexity we never experience any parts which are as discontinuous as the supposed elements in physical nature.[186]

Ward also spoke out against the reductionism of comparing higher mental states with lower. We noted earlier in connection with the mental chemistry of J. S. Mill that it formed a more inclusive concept than the older mental mechanics. Here we find Ward questioning the "propriety" of physical analogies and wondering if analogies to living objects would not be more appropriate for mental processes.

> We shall find in the growth of a seed or an embryo far better illustrations of the unfolding of the contents of consciousness than in the building up of molecules: the process seems much more a mere segmentation of what is originally continuous than an aggregation of elements at first independent and distinct.[187]

In William McDougall we find the extension of Ward's psychology and also close contact with modern American psychology since McDougall spent most of his professional life in this country, first at Harvard and than at Duke. McDougall was an interesting mix between psychology as the study of consciousness and psychology as the study of

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[186] James Ward, "Psychology," Encyclopedia Britannica, 9th ed., XX, 46 in Herrnstein and Boring, op. cit., p. 608.

[187] Ibid., p. 606.

behavior. However, by behavior he did not mean the type of behavior that Watson was popularizing at the same time; for McDougall behavior was a purposive action in which the whole animal was involved. In his comprehensive work The Outline of Psychology, published in 1923, McDougall listed seven marks of behavior which made it necessary to consider behavior as purposive. In order of appearance, they are: 1) spontaneity of movement, 2) persistence of activity independent of the continuance of the impression which may have initiated it, 3) variation of direction of persistent movement, 4) cessation of movements upon achieving a particular kind of change in the situation, 5) preparation for new situation toward the production of which the action contributes, 6) learning, i.e., improvement in the effectiveness of behavior when it is repeated under similar conditions and 7) the total involvement of the organism. From this list of purposive characteristics McDougall drew the conclusion that reflex based behaviorism does not meet the criteria for a true behavior theory which should be a "purposive behaviorism."

McDougall's efforts to deal with something more concrete than mere sensations are clearly shown in the following warning which he placed in the preface of that same 1923 Outline.

> The psychophysiology of the senses is a rich field in accumulated observations, the fascination of which as a field of research is not unknown to me. . . . The student who approaches psychology by this route is almost inevitably led into the mechanical, atomistic way of thinking which I would have him avoid. . . . The study of the senses is seductive; for this is one way of simplifying psychology and of enabling the student to feel that he is acquiring a solid basis of facts. But it is a simplification achieved at the cost of an abstraction from actual experience, the degree of which the young student does not easily understand. . . . We do at least deal with concrete realities rather than with abstract and artificial entities such as "the sensations" are.[188]

The fact that McDougall's seven marks of purposive behavior are oriented toward animals should not lead to the impression that he dealt only with animals. He preferred to define psychology as "the positive or empirical science of conduct or behavior" and in this sense empirical means the same type of psychology that was to be found in Brentano. In fact McDougall was very close to Brentano's psychology in many ways. For example, on the issue of the interpretation of experience McDougall, like Brentano felt that:

> Experience is not made up of things; it is a process and perhaps a train of activity. The most general and fundamental facts about experience as we know it, or enjoy it, are two. First, experience or experiencing is always an experiencing of something . . . even when, as in psychologizing, that object

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[188] William McDougall, <u>Outline of Psychology</u> (New York: Scribner's and Sons, 1923), p. xi.

> is itself an experiencing or thinking. Second, all experiencing or thinking is the experiencing or thinking of someone, some person, some organism. So far as we positively know, this someone, this subject, is always a material organism or is embodied in and manifests itself to us only in and through the medium of a material organism.[189]

He followed this statement with an elaboration of the use of the verb "to think" in which he likened his usage to that of Descartes' famous "cognito, ergo sum" by way of indicating that he saw this as the most general form of experience. This generalized form of experience was, for McDougall, a unitary whole in which aspects may be seen as distinguishable but not separable. His programme for the construction of a psychology which would deal with the unitary whole of experience was outlined as follows:

> The psychologist . . . build [s] up his description of the human mind by inference from the observed facts of behavior, the behavior of men and animals and from the observed facts of experience, facts of his own experience observed introspectively, and facts of others' experience described and recorded by them.[190]

From McDougall's critique of elementism and the "accumulated observations" of "mechanical and atomistic ways of thinking" it is obvious that the introspection he speaks of above is not the same introspection practiced by Wundt and Titchener. McDougall argued forcefully against

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[189] Ibid., p. 40.

[190] Ibid., p. 38.

"introspective mechanical psychology" and also against the "behavioral mechanical psychology" which was being propounded by Watson.

This criticism of Watson's psychology by McDougall, points up the fact that when Watson stated his original position in 1913, he was reacting to both the tradition of introspection (Wundt and Titchener) and also the study of consciousness (Brentano and McDougall). The extent of his criticisms, while well known today, still seems shocking, to this writer at least, since, in the first major theoretical publication he made after taking his original stance, Watson undertook to explain mental images as implicit language responses and also to define affect as slight vascular changes in the genitalia.

Given this type of disparity it is not surprising that the strongest American proponent of "mentalism" and the creator of behaviorism should find ample opportunity for a clash of opinion. Their debates over the issues were published in 1929 under the title of <u>The Battle of Behaviorism</u>. In this volume, we find Watson maintaining that:

> He who would introduce consciousness, . . . does so because of spiritualistic and vitalistic leanings. . . . The behaviorist can find no consciousness in the test tube of his science. He finds no evidence anywhere for a stream of consciousness . . . [but] he does

> find convincing proof of an ever-widening stream of behavior.[191]

Part of McDougall's rejoinder included the following colorful account of some missing aspects of behaviorism.

> I come into this hall and see a man on this platform scraping the guts of a cat with hairs from the tail of a horse; and sitting quietly in attitudes of rapt attention, are a thousand persons who presently break out into wild applause. How will the Behaviorist explain these strange incidents: How to explain the fact that the vibrations emitted by the cat-gut stimulate all the thousand into absolute silence and quiescence; and the further fact that the cessation of the stimulus seems to be a stimulus to the most frantic activity? Common sense and psychology agree in accepting the explanation that the audience heard the music with keen pleasure and vented their gratitude and admiration for the artist in shouts and hand clappings. But the Behaviorist knows nothing of pleasure, pain, of admiration and gratitude. He has relegated all such "metaphysical entities" to the dust heap, and must seek some other explanation. Let us leave him seeking it. The search will keep him harmlessly occupied for some centuries to come.[192]

Perhaps even Watson chuckled at McDougall's comment in which the concept of consciousness could be approached in such a light hearted way. It is doubtful, however, that he would have found amusement in McDougall's more serious and theoretical attempts to explicate the role of consciousness.

In attempting to relate his knowledge of neural

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[191] John B. Watson and McDougall, The Battle of Behaviorism (New York: Norton, 1929), p. 26.

[192] Ibid., p. 63.

processes to his conception of a unitary consciousness, McDougall was up against the same problem that the German physiological psychologists had faced. Their solution was to borrow British associationism as a basis for mental operation. McDougall, of course, was not willing to admit any explanation that did not meet his empirical criterion of the unity of consciousness which he knew directly through introspection. Thus, in his first published work, a volume titled Physiological Psychology, McDougall solved the problem by postulating a unitary psychic entity as follows:

> We are compelled to admit, or so it seems to the writer and many others, that the so-called psychical elements are not independent entities, but are partial affections of a single substance or being; and since, . . . this is not any part of the brain, is not a material substance, but differs from all material substance in that, while it is unitary, it is yet present, or can act and be acted upon, at many points in space simultaneously (namely the various parts of the brain in which psycho-physical processes are at any moment occurring), we must regard it as an immaterial substance or being. And this being, thus necessarily postulated as the ground of the unity of individual consciousness, we may call the soul of the individual.[193]

With this statement, we have come to an important crossroad in the development of psychological thought. Up to this point, we have traced the rise of modern psychology from philosophy and into various versions of theory. We

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[193] McDougall, Physiological Psychology (London: Dent, 1905), p. 78, McDougall's emphasis.

have also characterized the development of modern psychology in two mutually exclusive ways by considering the main development of psychology as psychology developed in the image of the natural sciences; a view which we have contrasted with its antagonist psychology as a human science. With this statement of McDougall we have come to the interesting comparison of the two views and the problems that exist between them.

3.1.4 A COMMON PROBLEM IN NATURAL AND HUMAN SCIENTIFIC PSYCHOLOGY

We have placed McDougall in the human scientific camp because of his basic theoretical position and fundamental similarity to Brentano. Thus, his over-all emphasis is toward the appreciation of immediate experience and the fundamental recognition of awareness as the most generalized form of experience. Recall that he likened Descartes' "cognito" to his "think" and that he asserted that the psychologists' description of the human mind was born out of observation--observation of others' behavior, self-observation, and the reported self-observations of others. Yet, in the above quotation we find McDougall struggling with the same issue that Wundt was struggling with; namely, how do you account for the unity of conscious phenomena when the obvious facts of the biological body assert that everything that goes to make up the body has a rather discrete character? Certainly, we are not surprised to see this argument because variations of it have been involved in most of the philosophy and psychology we have considered to this point. The fact that Wundt and the Structural school of psychology, appear to have ended up in the same place that human scientific psychology also naturally gravitates to, requires that we resolve the apparent lack of utility in the human scientific approach if we are to continue its meaningful use.

As psychologists, both Wundt and McDougall were concerned to explain consciousness. Wundt, good Newtonian that he was, started from the bottom up, as it were, and found that he could only explain the complexity of mental life by assuming that the elements of experience had somehow become associated with one another. Further, he was on solid ground in assuming the elemental nature of consciousness because: a) the entire cosmos appeared to be composed of elements and laws and b) nervous sensations in the brain were obviously punctiform sensations which had arisen in the sensory surfaces of the body. McDougall, for his part, followed Dilthey and Brentano and basically asserted that the unity of man's conscious life was a more important fact and a better place to start a description of man's consciousness than any other.

When they met in the middle, we find that each seemed to be missing something. Wundt, as he reached into the upper ranges of mental phenomena found himself severely criticized by Dilthey, and others, because the picture he was painting was not remotely related to life as they knew it. McDougall, as he descended into more intimate interface with physical phenomena found himself severely criticized by Watson, and others, because the description he was making apparently relied upon the out-worn doctrines of spiritualism and vitalism.

"The time seems to have come when psychology must discard all reference to consciousness"; Watson retorted as he delivered the opening salvo in his reaction to Wundt, McDougall and the theories they represented:

> When it [psychology] needs no longer delude itself into thinking that it is making mental states the object of observation.[194]

This was also the reaction of a good portion of American psychology and signaled the rise of a very pervasive aspect of the character of modern psychological thought.

Since we are not interested in giving up the human scientific approach to the characterization of the history of psychology, it is appropriate to turn briefly from direct historical concern and to consider the underlying character of the alternative view in greater detail.

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[194] Watson, "Psychology as the Behaviorist Views it," <u>Psychological Review</u>, XX (1913) 158-177.

3.2 NATURAL SCIENTIFIC PSYCHOLOGY AND DETERMINISM VS. HUMAN SCIENTIFIC PSYCHOLOGY AND FREEDOM

"Understanding has two modes of advance, the gathering of detail within assigned patterns, and the discovery of novel pattern with its emphasis on novel detail. The history of thought is a tragic mixture of vibrant disclosure and deadening closure. The sense of penetration is lost in the certainty of completed knowledge. This dogmatism is the antichrist of learning."[195] This sweeping statement by Whitehead is an appropriate opening to this section for we must now touch upon one of the classic problems of the modern era.

Our task is to define the issues of human freedom, which require a novel pattern of understanding, and mechanical determinism, which is the standard pattern of understanding, in such a manner that we can pass between the horns of the dilemma upon which Wundt and McDougall find themselves impaled.

In the psychology we have considered to this point, there has never been any doubt about the fundamental metaphysical validity of a completely determined world of atomic elements and immutable laws. Additionally, we have been at pains to show the relation between those basic

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[195] Whitehead, Modes of Thought (New York: Free Press, 1968), p. 58.

assumptions and the types of psychological theory that was created.

The first significant departure from tradition that we found was the psychology of Wilhelm Dilthey which derived from his insistance that the "individual as an element of society" was the basic fact upon which psychological theory should be based. The approaches of this type which we have followed up to McDougall, generally have a significantly greater breadth and intrinsic satisfaction in their formulations about the character of consciousness than is to be found in other types of psychological theory. However, as we have seen with McDougall, changes in the epistemological basis of the system also require changes in the underlying metaphysic if greater fundamental coherence is to result. So far, the human scientific alternative has not represented such a shift.

The need for this shift and the lack of it was best illustrated in the discussion of Brentano's concept of "intentional inexistence" which he used as a paradigm case for the act-intention distinction which was basic to his psychology. As we pointed out then, it is not possible, when using distinctions of this sort, to cross the boundaries between the physical and mental worlds without also reducing the argument to absurdity. Thus, Brentano could formulate the act-intention distinction, but could not meaningly treat a matter-intention distinction. It is for this reason that McDougall's explanation of consciousness sounds so spiritualistic to someone with a material ear and a mechanical heart.

The issue is physical determinism versus human freedom. All along the historical trail, the orthodox position of hard-headed physical science has been that the absolute determinism which exists at the atomic level must also exclude the possibility for human freedom. We observed Laplace's statement that the exact future could be predicted if we knew the exact state of all particles at one particular point. La Mettrie and Russell were quoted in a similar vein of "hard determinism." Further, this is also the view of modern behaviorism whose basic "Laplacian" assumption is that if we knew all the conditions (stimuli) then we could exactly predict behavior since the behavioral responses are lawful functions of external factors. That we are not able to completely predict behavior is attributed by Skinner, and most others, to our lack of knowledge of the causal stimuli. While more timid souls are inclined to ascribe the uncertainty to personal freedom, Skinner's sentiments are clear enough:

> If we are to use the methods of science in the field of human affairs, we must assume that behavior is lawful and determined. We must expect to discover that what a man does is the result of specifiable conditions and

> that once these conditions have been discovered, we can anticipate and to some extent determine his actions. . . . The self is most commonly used as a hypothetical cause of action. So long as external variables go unnoticed or are ignored, their function is assigned to an originating agent within the organism. If we cannot show what is responsible for a man's behavior, we say that he himself is responsible for it.[196]

As Skinner would have it, human freedom is simply another name for ignorance of the actual causative stimuli.

In this day and age it is difficult to excuse Skinner for such a hard determinism, based as it is upon the causality notions which derive from classical physics. This is for two reasons: First, classical physics has given way to atomic physics in which the concept of atomic causality is no longer applicable since the advent of the indeterminacy principle of quantum mechanics. Second: even the early concepts of Helmholtz and Fechner seem to be more advanced. Recall that they both left open the possibility that the operation of the mind could interface with the known facts of the law of conservation of energy in such a fashion as to: a) preserve the validity of the law and b) insure the freedom of the mind.

Before moving to other aspects of the discussion we will balance Skinner's behaviorism with the view of another

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B. F. Skinner, Science and Human Behavior (New York: The Macmillan Co., 1956), p. 6, 283 quoted in Barbour, Ibid., p. 306.

important contemporary psychologist thereby showing that the Wundt-McDougall problem is still with us. Carl Rogers states:

> I believe that psychological science will advance along the lines of discovering the order which exists in human behavior and experience. . . . As a psychologist I am always looking for the invariant relationships. . . .
>
> But I am also a therapist, a person who has lived deeply in human relationships. . . .
>
> I value the person. Of all the incredible forms of life and non-life which exist in the universe, the individual human being seems to me to have the most exciting potential, the greatest possibilities for an expanding development, the richest capacities for self-aware living.[197]

Rogers, then, can be said to exemplify a modern expression of the old desire for scientific expression which relates behavior to prior causation, and the equally great desire to recognize the fact of responsible personal choice as it exists, prior to any scientific description, as a prominent fact in our lives.

3.2.1 THE ACTIVITY OF SELF AND THE LAWS OF ATOMS

It seems evident that we can neither deny the possibility of behavioral science nor ignore the experience of responsible choice. But if we are not careful, we will find that we have not advanced much further than Descartes did when he formulated his original solution to the problem

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[197] Carl R. Rogers, On Our Science of Man in William Coulson and Rogers, eds., Man and the Science of Man (Columbus, Ohio: C. E. Merrill Company, 1968), p. 58.

of how the "soul could be lodged in the body" so that it could not only enjoy motor functions but also "have sensations and appetites and thus constitute a true man." Relating the activity of self to the laws of atoms has led either to Descartes' sort of dualism and its many subvarieties or to a reductionist point-of-view which asserts that the laws of higher levels can be explained in terms of the laws which explain the lowest levels of existence, i.e., a physico-chemical explanation. Determined atoms thus add up to determined people. And some method of introducing "slack" in the system seems to be required if we are to provide for the scientific possibility of human freedom. William James struggled with this issue and concluded that the universe requires some "looseness" or "disconnectedness" if man's experience of moral responsibility is to be considered as a viable scientific fact.[198]

The first problem to overcome is that of the "split-level" universe which was created as a result of the separation of mind from matter. Early scientists needed to push mentalistic concepts out of the way so they could get at a more meaningful description of the physical "facts" and modern psychologists need to push physicalistic concepts out of the way so they can get at a more satisfying

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[198] James, The Dilemma of Determinism in The Will to Believe (New York: Longmans Green and Co., 1921).

description of mental "facts." Modern Physics, with its indeterminate atoms is often looked upon as an excuse for "softening" the determinism of past scientific views. However, the assertion here is that there is no more "mental" or "spiritual" in the probability-wave of modern quantum physics than there was in the old world of billiard-ball atoms. Either view is equally reductionistic in terms of supporting a concept of human freedom.[199]

We will develop this topic at greater length in future discussions; for the present, we can rely upon the Gestalt insight that "the whole is more than the sum of its parts." On this view, complexly organized human behavior is an aspect of higher-order levels of complexity whose principles of operation are not derivable from levels of organization which are of inferior order. This distinction can be translated through all biotic levels and into the various hierarchies of the material world. However, before we go into details it is necessary to tease out the general meaning of the proposition and to understand it in terms of the psychological issues we have been treating.

When Dilthey's thought was introduced, we sought to demonstrate that his departure from traditional psychology was a change in the epistemological basis of psychological theorizing. In seeking explanations in terms of the

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[199]Barbour, op. cit., Chapter 10.

empirical facts of his own awareness, he, like the others who followed him, saw that there were no separate entities in the unity of consciousness. This denial of the appropriateness of elemental descriptions of consciousness has subsequently been corroborated by modern physics which has shown that in the physical realm the old concepts of visualizable, independent atoms and the total separation of the observer from the observed are naive assumptions. In their place, we have stress on the interaction of the observer and the observed and the weakness of visual models in portraying the reality of atomic events. With these developments came the realization that the connection between theory and experiment is very indirect and that theory can no longer be viewed as a literal representation of reality.

One of the ways which the physical sciences reacted to this situation was to conclude that theories are only useful means of coordinating observations. Percy Bridgman developed the view that concepts should be totally identified with performable experimental observations. "The concept is synonymous with the corresponding set of operations" he said, and the subsequent effects of "operational definition" upon the approaches thought useful to psychological experimentation are well known to even the beginning student of modern psychology.[200]

The development of operationism was a substantial contribution to all types of scientific investigation and we see its epistemological implications as a major corroboration of the human scientific insistence upon the empirical validity of the unity and scientific knowability of conscious life. Of course, this comparison is not to suggest that the methods which seemed appropriate to human scientists and the methods which are appropriate to operational definition in the physical sciences bear any obvious similarity. Rather, both operationism and the human scientific approach are to be seen as reactions, which came at different times, in different ways, and for different reasons, to the inappropriateness of attempting to account for the basis of knowledge with an epistemological atomism. As we have said earlier, epistemological changes are insufficient to resolve the basic issues which inhibit meaningful interpretation of the interface between physical and mental phenomena. It is not until we change the metaphysics of materialism which was the basis of the old atomistic epistemology that we will be able to escape the dilemma upon which the spirits of Watson and McDougall are still

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[200] Bridgman, The Logic of Modern Physics (New York: The Macmillan Co., 1927), p. 5.

See Chapter 5 for an expanded discussion of the character of scientific knowledge and its relation to philosophy and psychology.

skewered. This point is also corroborated by the fact that their modern counterparts, Skinner and Rogers, seem headed for the same fate in spite of the intervening years of scientific progress in the behavioral sciences.

3.2.2 THE LAWS OF ATOMS AND THE ACTIVITY OF SELF

In focusing more closely upon the basic issue of metaphysics and its relation to the problems of psychological theory, we should also survey a little larger piece of the landscape as we begin to burrow into metaphysical abstractions.

In his poem "In Memoriam" Tennyson invokes a priestess from the vaults of death and implores her to reveal her secrets: "'The stars,' she whispers, 'blindly run.'" "Tennyson goes to the heart of the difficulty" Whitehead writes:

> and states starkely the whole philosophical problem. . . . Each molecule blindly runs. The human body is a collection of molecules. Therefore, the human body blindly runs, and therefore there can be no individual responsibility for the actions of the body. If you once accept that the molecule is definitely determined to be what it is, independently of any determination by reason of the total organism of the body, and if you further admit that the blind run is settled by the general mechanical laws, there can be no escape from this conclusion.[201]

In this poetic statement and Whitehead's assertion, we have

[201] Whitehead, Science and the Modern World, pp. 77-78.

the central problem of the relation between mind and body that has characterized the entire development of western thought. Since we have seen the historical context, we can now focus upon the issues themselves.

Our problem is this, since mental experiences derive from the actions of the body, including its internal actions, we seem forced to conclude that they are either totally determined by the body or at least are restricted to those types of occurrences which do not determine the motions of the body. In neither case do we find a position that is useful for human scientific psychology. If we opt for the view that the mind cannot originate experiences then we shall have to assert that the human being has no responsibility for the actions of his body. On the other hand, even if we admit the possibility of some undetermined mental experiences, we are still without a means of affecting the body because the theory does not provide that mental experiences can act on bodily functions. But, the human scientific tradition asserts that we know this action intuitively. "The mighty of the content of mental life . . . which is consciously lived and originally given with immediate power" was the way Dilthey described it; however, this view does not prevail against the arguments of deterministic psychologists, e.g., Skinner, unless we can modify the basis for argumentation.

Whenever psychologists have attempted to formulate a theory of volition and motivation they have had to rely on some expression of the antecedent states of the mind or the states of the body, or both, and a great deal of time, talent and effort has gone into the creation of the various theories that characterize modern psychological thought. But we do not need to go into them here because the way the present argument is formed (assuming its validity) the real issue is quite simple.

> Either the bodily molecules blindly run or they do not. If they do blindly run, the mental states are irrelevant in discussing bodily actions.[202]

This statement would be a proof of the behaviorist claim if it were not for the fact that modern science has shown that the basic events of the molecular world are not independent of the external world. We now know that the Heisenberg Uncertainty Principle applies to a world that is nothing like the atomic entities which have been assumed as the basis for the metaphysics and epistemology of modern psychological thought. The key to this criticism of the doctrine of materialism is to be found in Whitehead's assertion that the whole concept of materialism applies to very abstract entities. By this he means that the original doctrines were established as a result of abstracting

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[202] Ibid., p. 79.

special descriptive terminology which applied only to very narrow aspects of the real phenomena; thereby, ignoring the richness of the interrelationships of the entities in question. In his words, we have:

> The concrete enduring entities are organisms, so that the plan of the whole influences the very characters of the various subordinate organisms which enter into it. In the case of the animal, the mental states enter into the plan of the total organism and thus modify the plans of the successive subordinate organisms until the ultimate smallest organisms, such as electrons, are reached. Thus an electron within a living body is different from an electron outside it, by reason of the plan of the body. . . . And this plan includes the mental state.[203]

The elements which are so modified by the plan of the body are still viewed as "blindly running" only they now do so in accord with the properties of the organism in which they find themselves. Whitehead calls this doctrine a substitution for the doctrine of materialism and appropriately names it "The Theory of Organic Mechanism."

With this formulation, we are back to the necessity of understanding the relationship between the whole and the part. To psychologists, already familiar with the Gestalt tradition that it is possible to discern immediate wholes in primary perception, the statement that a whole is not simply a juxtaposition of previously separate elements is quite acceptable. However, since the Gestalt whole is

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[203] Ibid., p. 79, Whitehead's emphasis.

viewed as a physiologically based process, which exists prior to and independently of whatever the elements of stimulation are, there has not been very much emphasis upon going beyond the bare formulation of the dependence of the part on the whole.

However, on the organismic concept, we can recognize that there are organisms of different complexities. In broadest terms they can be said to range from electrons, atoms, molecules, cells, organs, organisms, groups and communities. Such a generalized approach to organism immediately suggests that various levels of analysis are appropriate to understanding the various levels of "wholes" which are to be found in existence. Since these various levels differ as to the complexity of their organization, the concept of level forms an important part of the metaphysical alternative which is offered by the organismic concept.

In this view, a level of being is actually a metaphysical concept. In the older atomistic view the ideas of mechanistic laws (physical and psychic) were defined in terms of a methodological program and were not seen as metaphysical concepts. The fact is however, that such mechanism usually became a one-level metaphysics of materialism or atomism. This tendency is especially marked in American psychology which has had such a long-standing abhorrence of philosophical issues. Since the focus upon materialism has been so dominant in the modern era, psychology has always been at a loss to surmount the charges of vitalism and spiritualism whenever they were levied against any theory that sought to raise its head above the lowest level of "real" things. Any transition from dead matter to living function--especially conscious functions--is viewed with suspicion and alarm by those who have truly fathomed the meaning of materialism.

3.3 THE PHILOSOPHY OF ORGANISM AND PSYCHOLOGICAL THEORY

What we have seen of the philosophy of organism to this point is essentially those aspects of its formulations which have some direct articulation with various problems of traditional psychology. Rather than continuing to "back into" the highly complex and abstract system which Whitehead has created, it will be more useful if we briefly introduce Whitehead's philosophy in a more formal fashion.

Interestingly, Whitehead, like those in the human scientific trend which we have followed, uses systematic concepts which are derived from basic aspects of human experience.

We can refresh the idea in our minds with a few citations from earlier material:

Fechner stated:

> What will appear to you as your mind from the internal standpoint, where you yourself are this mind, will on the other hand, appear from the outside as the material basis of the mind.

and,

> The idealist may trace the action of the stimuli to a mental reason, the materialist may attribute choice and attention to a material reason. We, however, take the facts as they appear directly on observation, where at one time the material side, at another the mental side provides the evidence for the changed distribution.

From Dilthey we have:

> . . . only from the depths of lived experience can the strong impressions of [satisfaction, expansion and fulfillment] be drawn--it is not from inferences that our knowledge of causation, which makes the true system of life accessible to us, has arisen.

In Brentano we find:

> My position in psychology is that of empiricism, experience alone is my teacher. . . .

and, the science of psychical appearances should:

> . . . show forth the totality of psychic elements the combination of which makes up all psychic phenomena.

Finally, there is McDougall

> The psychologist . . . build [s] up his description of the human mind by inference from the observed facts of behavior of men and of animals and from the observed facts of experience, facts of his own experience observed introspectively and facts of other's experience described and recorded by them.

Each in his own way, the early pioneers of the human scientific approach felt the need to establish the validity of the personal experience which was the main part of their personal identity.

Whitehead takes a radical stand on the matter:

> . . . any doctrine which refuses to place human experience outside nature, must find in descriptions of human experience factors which also enter into the descriptions of less specialized natural occurrences. If there be no such factors, then the doctrine of human experience as a fact within nature is mere bluff, founded upon vague phrases whose sole merit is a comforting familiarity. We should either admit dualism, at least as a provisional doctrine, or we should point out the identical elements connecting human experience with physical science.[204]

We have seen that Whitehead's metaphysics is a set of general principles which are applicable to all levels of events and that the universe which is constructed with such levels and events is therefore both continuous and interrelated. In the abstract, all that sounds rather remote but it is also obviously true that man is a part of that universe and is therefore subject to the same descriptive properties, with one important addition. Namely, human consciousness is our direct awareness of the one portion of reality that we can know from the inside.

As Whitehead moves to the description of different

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[204]Whitehead, Adventures of Ideas (New York: The Free Press, 1967), pp. 184-185.

entities which exist on different ontological levels, he maintains the coherence of the system by asserting that the same internal processes of which we are conscious, in the portion of reality of which we are internally aware, are also present in all other entities on all other levels. This realization is the basis for Whitehead's departure from the old metaphysics and can also be seen to far surpass the assertions of the human scientific psychologists who were merely attempting to chip away enough of the monolithic material world to give their spirits, which they knew they had, enough room to breathe. For Whitehead, by extreme contrast, human experience is the paradigm case of all events in nature and therefore it is taken as exemplifying the generic attributes of all experience of any actual entity on any level in the whole universe.

Whitehead, has therefore turned the tables on the scientific world, instead of explaining human experience in terms of low level entities, he explains low level entities in terms of human experience.

Another important aspect of human experience was mentioned earlier in connection with the philosophy of Kant.

> Thus, for Kant the process whereby there is experience is a process from subjectivity to apparent objectivity. The philosophy of organism inverts this analysis and explains the process as proceeding from objectivity to subjectivity, namely, from the objectivity, whereby the external world is a datum,

> to the subjectivity, whereby there is one individual experience.[205]

A key word in this quotation is the word "inverts." Whitehead makes infrequent but important reference to the idea of inversion when he is attempting to show that the normal methods of analyzing material or mental phenomena are actually based upon the use of mental operations which are among the highest and most sophisticated modes of human functioning. He does not condemn this process but he is extremely forceful in rejecting it as constituting the sole method of human experience. Undue concentration upon the world of abstract thought has led us away from the realization that we also can and do know an important part of reality from the inside. Hence, Whitehead never misses an opportunity to get things inverted (in this case, the resultant would be right side up) so that he can begin to focus upon the validity and explanatory power, of which we are immediately aware and know by virtue of the fact that human experience, as an important instance of an event in nature, also demonstrates generic features of all experience.

3.3.1 MATERIALISM AND ORGANISM

Now that we have human experience firmly established within nature we can reexamine the all important problems of volition, intention, purpose, act, etc., that have been

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[205]Whitehead, Process and Reality, p. 236, emphasis added.

an important part of the alternative views which were offered by each of those who leaned toward the human scientific interpretation of experience. We are not treating these categories simply because they seem like important loose-ends in the traditional approach. On the contrary, the precise reason for their apparent ad hoc character under the old metaphysics is to be found in a central aspect of the organismic alternative.

The core of the argument runs like this, The natural science out of which psychological thought grew was based upon principles which essentially asserted the position that nature was dead--material bodies and inexorable laws. We have followed the development of these concepts and have appreciated the fact that, while there originally was a broad cultural and spiritual context of meaning in which the increasing specificity of scientific thought could grow, the scientific picture of reality gradually assumed prominence and claimed to be a complete system of truth. However, we now find cause to criticize the basic assumptions of that whole era. In place of materialism we have organism, and it is in organism that we can find expression of the self-creative aspects of being that were excluded in the old view. We can say that these aspects were excluded because of the following reasons: First, take Hume's analysis of causality. He basically ended up concluding that what we know in sense perception does not provide the data for its own interpretation. So causality just became a habit of the mind and nature was without its own reasons for doing things. Second, Newton had created a great edifice of physical understanding whose main ingredients, material bodies and laws of motion, had no intrinsic relationship. The Newtonian concept mass, for example, gradually became understood to offer no reason for the law of gravitation.

These two dominant factors of the scientific era provide a picture of nature in which no reasons can be found for the events of nature--sense perception is devoid of any data for its own interpretation and the basic system of scientific interpretation does not offer any reason why the phenomena behave as they do. What has happened in this progressively abstract development of science is that those aspects of the universe which we directly experience and the ways in which we experience them have been gradually pushed aside. The increasing adherence to the idea of isolated material entities and imposed laws has led to the conclusion that nature aims at nothing. When all scientific knowledge is restricted to a metaphysics which is based on narrow abstractions which give no reasons for the possibility of life and the phenomena of life are therefore forced to appear illusory. Dead nature can give no reasons for events since only life can express aim at value.

Whitehead therefore, wants to invert things precisely because if we continue to generalize about nature by basing those generalizations only on the highly abstract knowledge which is acquired on the basis of sense perception, we will find no reasons, and we will forever be unable to recognize our intuitive modes of understanding. It is in our own deep experience "the mighty reality of the content of mental life" that we find the penetrating understanding which enables us to realize that it is the essence of life to exist for its own sake and to exist as the intrinsic realization of absolute self-enjoyment, creative activity and aim.[206]

3.3.2 EFFICIENT CAUSE AND FINAL CAUSE

Against the old sharp division between nature and life Whitehead is asserting that the two should be fused together into a system which sees them as "essential factors in the composition of 'really real' things whose interconnections and individual characters constitute the universe."[207] In the resultant web of interconnected entities which interpenetrate each other's boundaries, Whitehead stresses the necessity of also regarding each event as an entity which

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[206] Whitehead, Modes of Thought, p. 152.

[207] Ibid., p. 150.

has its own perspective on the world. The event itself can be considered as a moment of experience which takes other events into account and which responds to them.

In contrast to Hume's causality, Whitehead finds that causality is far more than a mere habit of mind. Causality in the organismic framework is a complex process in which all of the internal and external factors in the awareness of an entity are woven into the pattern of self-creation. Thus, every new event is partially a product of the conditions which preceeded it. These previous events are its data to which it must conform but by which it is not totally determined. We may say that these data are the efficient cause of the event in question. This is Hume's causality whose relation with the other aspects of Aristotelian causality we have already explored. In addition to efficient causality, each entity contains an element of self-causation or self-creation in which it is in the nature of an entity to take account of or unify the data which are presented to it. The event unifies the data in its own manner and in accord with its own perspective on the universe. Thus each event is seen as contributing something unique to the process of its creation. Events, then, are not simply required to repeat the past but can also select from various possibilities that are open to them and thereby produce a novel synthesis which is more than the sum of its parts.

Given this sort of interaction of efficient cause and self cause we find that the resultant of the process is to provide, via the mechanism of creative selection of unrealized potentiality, in terms of the entities' own goals and aims, the equivalent of final causation.

This self-creation which ultimately results in final causation is seen to operate under what Whitehead terms "subjective aim." Subjective aim is an expression of the internal reality of things. It is also Whitehead's way of phrasing the insight of internal/external and within/without that we have found useful in earlier discussions. Here, however, in the philosophy of organism, the concept finds it most mature expression. In this view, each event is an individual instant of experience which is controlled by its own subjective aim. Antecedent events which are the influence of the past upon the present event can be viewed externally as efficient causality, they can also be viewed internally as the objectified past which produces a definite pattern for the new momentary subject to reproduce. Were it not for the possibility that each new subject can also possess an element of creative freedom there could be no escape from empty reenactment of past experience. However, each subject is able to influence the coming together of the data which are presented to it and thereby create a new unity which combines past experience with present experience and which, in turn, presents itself to the world as a datum for the future experience of other entities and also, of course, as a datum for its own future experience.

Thus, if we focus on the external view and consider only efficient causality we are then concerned only with the transition between events. In Fechner's words, "the material hides the spiritual." On the other hand, if we focus on the internal view and consider only final causality we are then concerned only with the ephemeral process of change. Again in Fechner's view we have "the spiritual hiding the material."

Another way of phrasing the Whiteheadian insight is to realize that both the material and the spiritual are required to be fused together so that we can realize that that which is "really real" is the actual entity which combines them both into the unity of its existence.

> in separation from actual entities there is nothing, merely non-entity--"The rest is silence."

The reality of the actual entity is contained in its subjective aim, its identity, its own inner awareness of its own being and its own destiny. It is this reality that Whitehead would have us enjoy and not turn away from in favor of abstract scientific views which focus only on efficient causality and the external aspects of entities. This also applies to the transcendental philosophical views that can only see pure potentiality devoid of any actuality.

In the progressive actualization of the pattern and potentiality of the past under the momentary influence of final causality, the actual entity is actualizing its own synthesis by a process which Whitehead calls "conceptual prehension."

> The point to remember is that the fact that each individual occasion is transcended by the creative urge, belongs to the essential constitution of each such occasion. It is not an accident which is irrelevant to the completed constitution of any such occasion.
> In the formation of each occasion of actuality the swing over from re-enaction to anticipation is due to the intervening touch of mentality. Whether the ideas thus introduced by the novel conceptual prehension be old or new, they have this decisive result, that the occasion arises as an effect facing its past and ends as a cause facing its future. <u>In between there lies the teleology of the Universe</u>.[208]

3.3.3 IMPLICATIONS

Let us go back for a moment and review the basic assertions. First, the philosophy of organism puts forward a metaphysical view which is applicable to all events on all levels. Second, the universe is clearly seen to be unified, continuous and interrelated. Man is therefore obviously a part of this system and we therefore arrive at another important realization. Third, it is in human experience that we can know this one aspect of nature from the inside. We

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[208] Whitehead, <u>Adventures of Ideas</u>, pp. 193-194, emphasis added.

are deeply aware of this internal reality and in its essence it forms "self." It is where we entertain the data of the past and respond to the destiny of future ends. It is really that in between where "there lies the teleology of the universe."

For the purposes of psychological theory and educational practice, we must realize that both mind and matter are simply two separate aspects, two different patterns of events, which have been abstracted from a single unified but complex entity. If we are concerned to educate children, we should not shrink from the realization that the highly abstract knowledge which we consider to be the essence of education has by and large been developed in exclusion from the complete reality of existence. However, it is one thing to criticize the mataphysics and epistemology of the materialist cosmology; it will be quite another to see the implications of the new view and to revise our approach to the psychological foundations of education and curriculum construction in accordance with them.

We must now seek to balance whatever "vibrant disclosure" is to be found in the philosophy of organism against the "deadening closure" of the philosophy of materialism. We cannot heighten our ability to know unless we enhance our ability to appreciate the sense of penetration which comes from the "discovery of novel pattern with its emphasis on novel detail." In this task, we share a common goal with those we would presume to educate for the teleology of the universe truly operates in the being of man.

Further aspects of the organismic reinterpretation of issues in science, philosophy and psychology will be considered in Chapters Five and Six, after consideration of the historical development of psychological thought is completed in Chapter Four.

CHAPTER FOUR

Section

4.0 EARLY TWENTIETH CENTURY AMERICAN PSYCHOLOGY

By now, we have considered enough of the history of psychological thought to be able to develop the implications of Whiteheadian process philosophy. As we have seen, the basic metaphysical issues which Whitehead raises apply to concepts which were primarily developed in the seventeenth and eighteenth centuries. The result of this is that it is therefore possible to talk about the psychological implications of Whitehead's thought with considerable disengagement from the topical issues of current psychology. However, while that is possible it is not desirable since it is important to understand something of the relationship between any new development and its predecessors. In addition, if our intent is to understand rather than to prescribe, to describe rather than decry, we must seek to articulate the relationship between alternative points-of-view.

Appearances to the contrary not withstanding, the intent of the previous historical material has been to provide a preparation for the introduction of the process alternative rather than to compile a history of the development of psychological thought. In past centuries and until the early part of this one the central issues with which we have dealt are rather closely related both in terms of the ideational base and also in terms of their relative geographical diffusion. In the twentieth century the situation is quite different, for we now have the burgeoning growth of American psychology to deal with. Since we have already made the basic statement as to the departures which are suggested by the organismic alternative we can now, with this portion of the history, focus primarily upon the contrasts between the organismic approach and the various dominant schools of psychological thought. Thus, the following rendition of psychological history will be even more stylized and topical than that which has already been presented. In a very important way, this is purely a practical matter since it is obviously impossible to serve the purpose of this presentation while clinging to the goal of a detailed account of modern psychology.

Twentieth century American psychology is generally recognized to have begun its mature formulation just about the turn of the century. The initial phase of this development which lasted until about 1930 is a period in which psychology was divided into various "schools." These main divisions are generally agreed to encompass: a) associationism, which is the old British school reshaped into the American stimulus-response format, focused primarily on learning and memory, b) structural psychology, the development and demise of which we have already considered--Wundt and Titchener being the key figures, placed greatest emphasis upon sensation, c) functional psychology, the first American school, tended to be diffuse but generally focused on "what" was done and "why," d) behaviorism, originated with Watson in 1912, primarily concerned with motor activity, e) Gestalt psychology, originated in Germany in 1912, primarily concerned with patterned perception and f) psychoanalysis, originated in Austria in 1900 with Freud.

At the beginning of the twentieth century the situation with the developing schools was quite similar to the conditions which prevailed at the beginning of its predecessor, the nineteenth century. In both cases, the growth and development of the newer views was being spurred on by a strong reaction to the older traditions. At the beginning of the earlier century, psychology gave up the philosophier's armchair for safety and security of the laboratory and its recorded data. By 1900 the trend was so well established, that psychologists were finding far more interesting subjects for empirical investigation than the "old" subject of consciousness. Associationism was the main theoretical position that was available, although even before the advent of Behaviorism there was a shift of emphasis toward the study of behavior and the use of objective methods as opposed to introspection. In general, at the turn of the century there was an abundance of open and interesting questions to pursue, a generally accepted rejection of the "classical" approach to the study of consciousness and a youthful vigor and optimism. E. G. Boring writing in 1950 stated:

> Psychology as an institution, replicating the life of an individual, has now passed beyond the adolescent to an independent maturity of both living and thinking.[209]

Thus, the period of the "schools" in psychology is equivalent to the thirty year adolescence of the "being" we know today as modern psychology. Boring follows the above statement with the observation that, "Actually the change has been secured more by proliferation than by individual growth." We would certainly agree in the sense that the fractionated personality of modern psychology is probably a direct result of the deep conflict and extreme identity crisis which it suffered during its adolescence.

With this brief over-view we can now turn to the stories of the schools themselves. Taking them in the order mentioned above, the first major division is that of Associationism.

4.0.1 ASSOCIATIONISM

Associationism is obviously an old school of thought whose history we have covered in considerable detail. The figure of one man looms of considerable importance for the doctrine of associationism in the nineteenth century

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[209] Boring, <u>History of Experimental Psychology</u>, p. 742.

because he simultaneously deflected the course of the doctrine and created a new and important approach to psychological experimentation. Hermann Ebbinghaus (1850-1909) also came about his important discovery in an interesting way. Boring[210] relates that Ebbinghaus, at an early point in his career, spent seven years in independent study during which he ran across a copy of Fechner's Elements of Psychophysics in a second-hand bookshop in Paris, became interested in the possibility of exploring the higher mental processes and set to work on the problem. He did most of the work on his formulation while living in England and therefore quite naturally came across the associationist approach to mental functioning. With the theory from England and the method from Fechner, Ebbinghaus created the first empirical study of association or (in the new frame of reference) memory. His was a rare pioneering effort in its own right and doubly significant because his original data yielded memory curves which are still valid for that type of experiment and, of course, the nonsense syllable will forever stand as a symbol of his inventive genius. Needless to say he gave associationistic theory a big boost.

Ivan Pavlov (1849-1936) was also operating at this time with quite another slant on associationism. The versatility of the doctrine is shown by the fact that Pavlov

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[210] Ibid., pp. 386-387.

the physiologist could also apply it to the relations between glandular secretions and muscular movements. This adaptability of the associationist doctrine brings to mind Lowry's cryptic comment regarding J. Mill's associationism to the effect that: "there was simply nothing that Lockean mental mechanism could do for an encore."

By far the major figure in the American school of associationism was Edward Thorndike (1874-1949), not only because he was a well-known and influential psychologist but also because it is said of him that "he represents the closest approach to a purely associationistic system since James Mill."[211] Apparently, there was room for an encore, and Thorndike made it. Thorndike saw psychology as the study of stimulus-response connections but also went far beyond the narrow traditional view of stimulus and response. Practically everything from external stimulation to hypothetical internal states seemed to be connected with responses which themselves could range from muscle twitches to mental arousal. He is best known for the so-called "law of effect," which basically means that behavior which has a welcomed effect is learned as the correct response (the response became fixated by "connection" with the stimulus). His later work, done with humans rather than cats, prompted

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[211] Marx and Hillix, <u>Systems and Theories in Psychology</u>, pp. 116-117.

a revision of the theory in which the concept of reward replaced that of effect as the key variable.

Thorndike led a long and active career in psychology during which he published extensively on highly technical subjects and did much, via his learning theory toward defining human learning. This interest led him into mental testing and also into educational practices. He published a work in 1903 entitled Educational Psychology which was closely followed by Mental and Social Measurements. These texts largely established the basis of educational psychology as distinct from pedagogy and child-study.[212] In addition they also brought the first application of Galton-Pearson correlative statistics into the area of predicting educational success.

It remains to be said of Thorndike's psychology, that because of the mechanistic determinism which is inherent in the whole associationist program, Thorndike found himself severely criticized for destroying human values. However, he did not see it that way; speaking of the need to treat man and nature by the method of science, Thorndike asserted:

> Thus, at last, man may become ruler of himself as well as the rest of nature. For strange as it may sound man is only free in a world

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[212] Boring, op. cit., p. 569.

> whose every event he can understand and foresee. Only so can he guide it.[213]

Further, speaking in quite another context, he said of philosophy and its relation to psychology:

> Under no circumstances, probably, could I have been able or willing to make philosophy my business.[214]

Thus, we see that the major popularizer of the doctrine of associationism in this country also established the doctrine as a methodology and was not concerned with either the philosophical issues or those aspects of conscious life that were ignored by the doctrine. Thorndike's psychology was clearly in the tradition of psychology as a natural science and we may therefore, safely assume that modern approaches to educational psychology were established upon a very narrow view of the mind of man which was, in turn, based on an impoverished philosophical doctrine.

After Thorndike retired, associationism declined in systematic importance and degenerated into a medley of methodological applications in which associations became simply whatever it was that was going on between the S and the R in S-R psychology. Clark Hull used it in his elaborate hypothetical-deductive theory, Spence and Guthrie have applied doctrinaire association theory in their own theories

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[213]Edward L. Thorndike, quoted in Marx and Hillix, op. cit., p. 124.

[214]Ibid., p. 118.

of learning. In addition other important attempts to use the doctrine by alloying it with other types of psychological theory are to be found in the work of Miller and Dollard, whose frustration-aggression hypothesis was a mixture with Freudian psychology. Tolman achieved a synthesis with Gestalt psychology which was concerned with the association of stimuli with each other into "sign-gestalts" while Skinner, on the other hand, requires some sort of association between the response and the reward in order for the behavior of the animal to be modified. In all, it is easy to casually agree with Marx and Hillix when they conclude:

> It is clear that the associationistic principle must be accorded a key role in psychology, whatever the ultimate fate of the various systems and theories which build upon it as a necessary and sufficient principle. Some kind of associationism is certainly necessary, in a methodological if not systematic or theoretical sense . . .

They continue by equating the longevity of the doctrine with its vitality and conclude by stating:

> It will be most interesting to observe the fate of associationism under the increased empirical and theoretical attack which it is now sustaining, as in the rapidly expanding research utilizing mathematical models.[215]

We find several major problems with the above summary which is a typical commentary on associationism. First, is the

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[215]Marx and Hillix, Ibid., p. 128.

suggestion that methodological associationism can somehow be a useful doctrine. This statement clearly shows the typical American disengagement from philosophical issues. Observe the levels that must be transversed in order to get to the real problem with associationism. Methodology would have to fall back upon some systematic theory, which in turn would require an appropriate epistemology which could only meaningly be based upon a correspondingly harmonious metaphysics. Yet, we rarely address these issues, preferring instead to elaborate more sophisticated methodological approaches while assuming that things like math models can represent a challenge to the doctrine. If a challenge did occur it could only be a methodological one which was capable of destroying the one methodology which it challenged and thereby serving only to prepare the way for the regeneration of a new one from the underlying philosophical basis. One may call such replacement "vitality" but it hardly seems that either the death, transfiguration or creation of such methodologies has anything to add to the study of psychology as a human science.

4.0.2 STRUCTURAL PSYCHOLOGY

Structural psychology is the next system on our original list and we mention it here solely for the sake of continuity since there is nothing to add to the commentary already provided in Section 3.0.3.

4.0.3 FUNCTIONAL PSYCHOLOGY

Functional psychology, it is widely held, is difficult to classify because it has never developed a tightly defined and formal systematic position. It can however, be broken down into phases which coincide with major aspects of its development. These are; its antecedents, its founders and two styles of popularizers. Taken in order, we have first the antecedents who were William James (1842-1910), James Cattell (1860-1944) and G. Stanley Hall (1844-1942). James, of course is the best known of the group and we have already considered his criticisms of Wundtian elementism in an earlier section. Rather than repeating that material here, we can consider the program which James offered in place of the older doctrine.

James, good American that he was, was concerned that psychology should be pragmatic. There needed to be some value and use that could come from the study of psychology. Accordingly, he stressed that psychology should study the functions that man's behavior served in terms of his useful adaptation to the environment. Of course, his most famous contributions concern the character of consciousness. In the original contributions he made to this area, James inveighed against any view which did not account for the obvious facts that consciousness was a unitary and individualistic process which in addition to being able to make choices was also purposive. He recognized that the true issues were deep philosophical issues and spent the later portion of his career as a philosopher rather than a psychologist. We will consider this aspect of his work in greater detail in later chapters when we come to further Whiteheadian implications for personality and educational theory. Here, we will simply remark that James' concern with the necessary philosophical basis of psychological theory was shared by Whitehead who considered that one of his "preoccupations" had been to "rescue their [James, Dewey and Bergson] type of thought from the change of anti-intellectualism."[216] George Miller has provided a useful summary of James' contribution in which he concludes that it is easier to appreciate him than to attempt to evaluate him. His inspiration, sensitivity to the richness of inner experience, intelligence and penetrating prose all add up to the fact that "it is obvious that he was and still is, the foremost American psychologist."[217]

G. Stanley Hall and James Cattell were highly influential at the time of the dawning of American psychology. Hall was the first American Ph.D., under James, and contributed greatly to the actual founding of psychological

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[216]Whitehead, Process and Reality, p. vii.

[217]George A. Miller, Psychology (New York: Harper and Row, 1962), p. 78.

science, founded the American Journal of Psychology and the Journal of Genetic Psychology, and was twice president of the American Psychological Association. He is known as a genetic psychologist because of his concern with development in humans and animals. His work was heavily influenced by the rising tide of enthusiasm for Darwin's work. To Hall, the study of children was the way to "reveal" the past history of the human race. He was very impressed by the wide and varied evidences of recapitulation that were to be found in what he considered to be the original psychological tendencies of the human race.

It is perhaps this very tendency to account for human physical and psychological development in terms of its comparison with environmental aspects that was most responsible for alleviating the need to create a highly abstract explanatory theory. Hall described rather than explained and as a result produced much data in the area of child development and education. As such he left a legacy of important data; unfortunately, his emphasis upon the evidences of recapitulation created a dominant bias to see most child behavior as evidences of lower-order phylogenetic phenomena and therefore, was not led to emphasize the emergent aspects of that same evolutionary process. It is to James Cattell that we can turn for the creation of a dominant preoccupation of American psychology-individual differences.

Practically every author who deals with Cattell or Wundt and his first American Student, remarks about Cattell's aggressive insistence on becoming Wundt's first laboratory assistant and his further insistence on studying individual differences, a topic for which Wundt felt no enthusiasm other than labeling it "ganz Americanish" (completely American).

Cattell founded the journal Psychological Review and was a major proponent of mental testing. Like Thorndike, his student, he saw Galton's measurement and statistical methodology as an important method of quantifying people into rankings and ratings. Because of the strong bias toward the evolutionary aspects of development, Cattell's "mental tests" were biased toward detecting differences in more elementary bodily functions rather than higher-order mental abilities.

Cattell, as might be expected, was a highly independent individual, even to the point of living fourty miles out of town and refusing to submit his children to traditional schooling, preferring instead to allow their independent exploration of both the physical and intellectual worlds. Ernest Hilgard relates that Cattell used graduate students to meet some of the highly individualized educational requirements which developed out of the growth of the children's own independence.[218]

Thus, Cattell, like Hall, did not contribute a great body of theory but did manage to popularize a large amount of the psychological tools which were at hand. As an indication of the genetic/developmental basis of the mental testing movement, John Dewey is reported to have accounted for the fact that mental testing did not flourish in England where it actually started because "a psychology of individual differences can only flourish in a democracy, as the findings of a psychology of individual differences never support the notion of innate class differences."[219] That remark, coming as it does from John Dewey seems rather astonishing in light of today's awareness (Arthur Jensen and William Shockley to the contrary) of the ability of those efforts to not only perpetuate but to re-create, in each new generation, the same "innate" class differences they pretend to measure. The "security" of the older view must certainly have been a direct result of the mechanist views of science which spawned the psychological inquiry.

In comparison with the European psychology of the time and also today, for that matter, American psychology must be seen as a sort of rough and ready shirt-sleeve affair,

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[218] Ernest R. Hilgard, personal communication.

[219] Donald P. Schultz, A History of Modern Psychology (New York: The Academic Press, 1969), p. 122.

bent upon the same type of pioneering exploration that characterized the western frontier. As in national development, psychological development, has subsequently found that great "progress" along narrowly defined lines can, and does, inevitably lead to serious ecological problems.

It is no doubt a deep appreciation of these problems that led John Dewey (1859-1952) to become the founder of what is recognized as the formal functional school of psychology. Dewey at one point studied under Hall and was always concerned with the molar environmental aspects of behavior rather than the molecular approaches common to introspection and physiological psychology. His classic contribution to psychology is his paper on the reflex-arc concept of behavior. For Dewey stimulus and response were simply convenient, but misleading, abstractions from the realities of man's unified conscious life and the continuity of his physical environment.

Dewey's main concerns were however, with philosophical issues and their relation to social practice. His intent in progressive education is an outgrowth of the pragmatic spirit which animated his philosophy. Education, for Dewey, was life, learning was doing and the student was more important than the subject matter. In many ways his protest was similar to that which we have labeled human scientific and his basic feelings seem quite similar to some of those we have observed in Dilthey. For example, he felt that behavior should never be treated as an abstract artificial construct which appeared to have meaning outside of its relation to the organism and its adaptation to the environment. The total organism and its environment was the only proper subject matter for psychology.

With this broad definition of the field of psychology it seems little wonder that functionalism is so difficult to classify. As a movement it was larger in scope than any of its rivals, e.g., behaviorism (obviously), Gestalt psychology and even psychoanalysis. It was the different basis for the abstraction of its central concepts, life itself, that proved to be both its greatest strength and its greatest weakness. Strength because it opposed artificial abstraction and the useless reification of mentalistic concepts and weakness because its lack of these same concepts exposed the heart of its philosophical doctrines to the "slings and arrows of outrageous fortune." Eventually, especially after Dewey's retirement, the functionalist insistence upon both the objective and subjective aspects of behavior, the need for applied rather than pure psychology, the use of mental operations as opposed to mental elements and the functionalism that characterized the individual organism's relation to the environment, were all slanted back again into the direction of natural scientific psychology.

One of the basic reasons for this change is that the true basis of psychological theory was neither discussed for what it was, nor altered in directions suitable to support the functionalist epistemology. Functionalists of the more experimental orientation used associationistic principles in their explanations of learning processes and although they were primarily interested in the rate and course of learning behavior rather than the hypothetical basis of the internal processes, it must be said that their position represented no greater metaphysical shift than that which characterized Dilthey's psychology. Thus, it seems quite natural that the demise of progressive education in this country could have been realized at the hands of a more limited but far more vigorous and rigorous emphasis upon the "scientific" aspects of psychological thought which were the first cousins of functional psychology in the family of metaphysical materialism.

The two important trends which emerged from functionalism were started with James Angell (1897-1949) at Chicago and Robert Woodworth (1869-1962) at Columbia. These branches, the Chicago and Columbia schools of functionalism, have left an important legacy of psychological theory and data. Chicago is mostly known for its emphasis on verbal learning, B. J. Underwood being one of its better-known alumni. Woodworth stressed a dynamic psychology in which he had a definite place for the contribution of the organism. His insistence upon this fact was originally symbolized and is now immortalized by his alteration of the familiar S-R formulation into the form S-O-R. A primary difference between the two trends of functionalism was Woodworth's emphasis upon motivation. In this, Woodworth went a long way toward establishing the "drive" concept in psychological thought as the mechanism by which the "purposive" responses of the organism are activated. Thus the drive concept was established early on and, like many other aspects of functionalist thought, had a definite bias toward more elementary bodily functions as opposed to higher-order aspects of purposive behavior.

One of the major criticisms of the whole functional approach has come on just that topic which was the closest to their central position. Functionalism obviously focuses upon the utility and purpose of behavior. It is therefore also interested, by definition, in the "ends" of behavior. However, mechanistic natural scientific psychology is always found to be extremely intolerant of explanations which imply a purposive teleology. As we have seen, "dead matter can provide no reasons" and the same philosophical problem which prevents the understanding of human freedom is active here in functional psychology. The major effect of this criticism was to force functional psychologists to focus upon immediately proximal stimuli as causally efficacious in the behavior they described. Out of this bias has grown the great reliance upon physiological explanation of drive and need states so that the charge of teleology can be avoided. We will meet this topic in later chapters when we will consider just how "purposive" a "functional" definition really is and will also explore the epistemological alternative of using levels of analysis which can be equated with the Whiteheadian organismic alternative of a multi-level metaphysics.

4.0.4 BEHAVIORISM

Behaviorism. Since classical behaviorism has figured so prominently at several points of the presentation there is little that remains to be said at this point. Instead, we can simply catalog its main aspects. For Watson, and those he influenced, behaviorism was "that division of natural science which takes the behavior . . . of people as its subject matter."[220] Its main postulates were: a) behavior can be analyzed into elements by the methods of natural science, b) behavior is composed entirely of glandular secretions and muscle movements ultimately reducible to physiochemical explanations, c) every response has a stimulus which determines it and d) conscious processes

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[220] Marx and Hillix, Systems and Theories in Psychology, p. 140.

are vestigial remains of the earlier philosophical era of psychology.

Watson, in spite of his antitheoretical emphasis, supplemented the classical conditioning of Pavlov, which he thought was basic to all learning processes, with a few concepts borrowed from Thorndikian associationism. That is, the factors of frequency and recency from associationism were required to explain, for example, the acquisition of conditioned fear in infants. This is because the classical conditioning paradigm involves the substitution of one stimulus for another whereas, instrumental conditioning involves the substitution of one response for another and the associationistic variables are the only ones useful in such a situation.

One of the longest standing and most authoritative critics of behaviorism is Sigmund Koch who says:

> I have given half a career as psychologist to the detailed registration of scholarly horror over the phenomenon--and strange time course--of behaviorism . . . I am tired of "demonstrating" that the main thread of continuity in the wildly erratic 50-year course of this "school" is a misinterpretated version of an epistemology which even in its "proper" philosophical formulations was monstrously deficient; . . . it was always biased toward the selection of nonsensical or trivial problems . . . [and] has produced a science which denies its subject matter in principle and

insults it in practice.[221]

We obviously agree with Koch's assessment and would only like to add, in line with the comments we made in Section 1.2.4 when Watson was compared with Descartes, that the main philosophical effect of Watson's psychology was to mitigate the strict determinism demanded by a completely reductionistic natural science approach in favor of a contingent determinism which "ought to make men and women eager to rearrange their own lives." How the novelty of "rearrangement" was to be accounted for apparently did not occur to Watson and in this he exemplifies Rogers' later criticism of Skinner in which Skinner is ridiculed for his use of subjective concepts. Rogers claims Skinner's story of how he became a scientist is:

> . . . studded by such phrases as, "This was, of course, the kind of thing I was looking for," . . . "Of course, I was working on a basic assumption."

To Rogers, these phrases can only relate to an "intuitive trust which he [Skinner] placed in his own experiencing,"[222] failing completely to realize, as also Watson did, that it was those very experiences that guided his subjective

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[221] Sigmund Koch, Value Properties: Their Significance for Psychology, Axiology, and Science, in Toward a Unity of Knowledge, Marjorie Grene, ed., Psychological Issues, VI, No. 2, Monograph 22 (New York: International Universities Press Inc., 1969), 251-252.

[222] Rogers, On Our Science of Man in Coulson and Rogers, eds., Man and the Science of Man, pp. 62-63.

apprehension of his proper scientific directions. While we agree with Rogers, we, and surely also Rogers, would be the last to claim that infallibility is also an important aspect of the universality of man's conscious and purposive life. We should also note that there were others who assimilated and carried the mark of behaviorism in their work. Albert Weiss popularized the doctrine for many years, published a text called Theoretical Basis of Human Behavior in which, among other things, will power was seen as excess brain excitations which built up because there was no immediate outlet and subsequently spilled over once the inertia of the system had been overcome. Perhaps Karl Lashley is the best known of Watson's students, who by virtue of his focus on physiological psychology, gradually moved away from the strict S-R position and became closer to a field-theoretical position.

4.0.5 GESTALT PSYCHOLOGY

Gestalt psychology is the product of the response to elementism which Wundt's psychology generated in Germany. The Americans went functional whereas some of their European colleagues turned to the gestalt experimentalism which arose after the initial loosening up had been provided by Dilthey, Brentano and Stumpf.

One of the most important aspects of gestalt psychology, for our purposes, is the nature of the new theoretical basis which it introduced into psychological theory. The major characteristic of gestalt explanations is that they are not elementalistic and mechanical and as such differ significantly from classical associationistic approaches to the explanation of mental phenomena. However, in terms of one of the major themes of the argument presented here, it is also true that gestalt psychology is just as physicalistic in its orientation as had been the psychology of John Locke or Wilhelm Wundt. A gestalt field is an equally reductionistic borrowing from the physical sciences as were the "elements" of the old view. The unique nature of gestalt psychology is to be found in the advent of the field concept in the physical sciences and subsequent application to psychological theory.

There is an interesting repetition of history that is associated with the development of the field concept in psychology that demonstrates the influence of physicalistic reasoning in a very direct way. In Section 2.2.5 when we discussed the eighteenth century psychology of David Hartley, it was noted that his unique contribution to associationistic psychology was the use of the Newtonian concept of "action at a distance" as a major element in the explanation he developed regarding the physiological processes which were responsible for the association of separate ideas. What Hartley did was to assume that the physical principle of action at a distance, which explained how two physically separated bodies could attract or repell each other, must also have a mental counterpart which was based upon some equivalent property of the nervous system. We have seen that Hartley's formulation was not a major contribution to the associationistic school and that, in general, associationists tended to ignore the problem of actually specifying the physiological substrate of memory. The interesting aspect of this discussion is that it is not until we get rather well into the twentieth century and the revision of the Newtonian concept that we find another and far more serious attempt to tackle the problem of what is going on in the brain during mental operations. That attempt was the gestalt psychology that came as a direct outgrowth of the change from the old action at a distance concept to the newer field theoretical constructs. Once we see the main differences between the two concepts, the relationships of gestalt psychology to both natural scientific and human scientific psychology will be much clearer.

Turning first to the older view, we find that Newton's use of "action at a distance" was a direct outgrowth of the basic metaphysical assumptions of the Galilean tradition. In this tradition all physical phenomena had to be explained in terms of matter in motion. Newton's difficulty was to explain how bodies which were physically separated could influence one another. There was obviously some sort of "action at a distance" between two things that might be attracting or repelling each other. But this is not easily explained in terms of a metaphysics that consists of only matter in motion. Unless, of course, one wants to result to a "nonscientific" or spiritual explanation of the facts. So what Newton did, in order to preserve the integrity of the whole explanatory system, was to create a material medium that could transfer the force from one body to the other. He called this hypothetical material "ether" and in so doing saved the materialistic metaphysic from a basic inconsistency.

Without seeking out any of the exact details, we can see that an ad hoc hypothesis about such a basic issue is bound to cause trouble for the physical sciences. By the early nineteenth century it was quite obvious to physicists that there were such things as forces that were capable of being propagated in empty space and in the complete absence of any requirement for an "ether." Once forces had become independent of any material medium and were seen in their own right they then came to assume the attributes which were originally thought to belong to the material ether. Thus, forces became fields of force that had properties like extension and configuration in space and also strength which was a continuously variable function of the density of the field.

Seen in this light, Wolfgang Kohler is something of a latter day David Hartley, since his application of the field of force concept to psychology is exactly analogous to Hartley's use of that concept's predecessor which had been created by Newton. Before we consider the direct application of the physical theory to psychological phenomena we should take a brief look at the main psychological phenomena that seemed in most need of a new interpretation.

The concept of a psychological gestalt was actually developed in 1890 by Charles von Ehrenfels who discovered that in the perception of musical form, the melody perceived was not simply the sum of the tonal elements. That the same melody can be composed of different tones or that different melodies can be constructed of the same tones indicated to Ehrenfels that perceptual form-quality was a more basic factor than the explicit sensory elements. Form-quality was seen to derive from the pattern of interrelationships of the sensory elements. He actually called the form-qualities "Gestalt qualitaten" and even extended the concept into other sensory modalities.

Even if the basic facts do seem a bit naive, this is really a significant departure from the elementalistic view. In Wundt's psychology, for example, there was only room for punctiform sensations which were associated with one another.

On this view, the perception of a square was determined by the fact that while the individual sensations which correspond to the lines and the various parts of the figure could be perceived the "form" of the square was not given in direct perception. This all important quality which gave the meaning to the elements was thought not to be the result of perception but, in fact, the result of apperception. That is, a process which is established as a result of associative inference. This inferential process also included information which was added by the motion of the eyes in sensing the figure so that the additional information as to the configuration of the stimulation could be obtained.

From this it can be seen that the necessity of eye movements is basic to the Wundtian elementalistic theory. What the gestalt psychologists did was to show that there were cases where the motion of the eyes was not required for the perception of a quality that, on the basis of the old theory, required the use of eye movement. Their crucial experiment involved the use of alternately flashing lights whose duration was too short to allow eye movements but were, none-the-less, perceived as one light moving back and forth rather than two flashing lights.

Armed with this sort of conclusive experimental evidence the early gestalt psychologists sought out a theoretical basis to account for the phenomenon. Of course, the newly arrived conceptualization of field of force, which was something both extended and configured, seemed like a natural choice to explain a perceptual process which seemed to possess inherent perceptual properties. Since the brain is also a physical system, it was assumed to exhibit the same configurational aspects which are found in purely physical fields. The major assumption that was required, aside from the original one of field forces in the brain, was that the perceptual processes of which we are aware are actually isomorphic with the brain processes which underlie them. Unless the gestalt psychologists could insure that the physiological processes in the brain were actually of the exact type that seemed to be required by the nature of perception itself, they would have no grounds for asserting the field interpretation of perceptual processing. To accomplish this needed feature they postulated the principle of isomorphism which asserts:

> Experienced order in space is always structurally identical with a functional order in the distribution of underlying brain processes.[223]

By projecting this definition back into the brain process the gestalt psychologists were able to insure that the hypothesis of field could be made functional. The basic

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[223]Kohler, quoted in Marx and Hillix, _op_. _cit_., p. 183.

theoretical change this represented amounts to this. The old theory assumed that elements of sensation were acted on by brain processes which simply mediated the transfer of these sensations to the various projection areas in the brain. In this case, the final perception was seen as the result of an apperceptive process that derived from unconscious associative inference. In the new gestalt theory, the mediating brain processes are no longer simply a one-to-one transfer of sensation but, instead, actually become the mediating brain processes that have the character of the actual perception.

This new concept of active mediation by the brain profoundly changed the old view which saw the brain as a passive receptor. Whereas the old theory basically considered the brain as a telephone exchange with fixed neurological pathways and interconnections the gestalt view definitely predicted that there are distributed field-like forces in the brain that account for its behavior.

It is possible to pursue the rise of gestalt concepts into many and diverse areas of psychological thought. However, for our purposes it must be stressed that the field theoretical concepts are just as reductionistic and deterministic as those which they replaced. This is not to deny that gestalt psychology did not provide a more reasonable explanation of many phenomena than the associationistic approach; certainly, the nature of field concepts seems far more inclusive than simple concatenation of elements and one would expect a higher quality explanation to result. What is to be denied however is that the gestalt approach allowed any greater freedom to consciousness than its predecessor. Even though Kohler himself wrote about extensions of the gestalt principles into widely diverse areas such as ego, attitudes, emotions, will, memory, and learning, he was forced to do so only by strict generalization of the basic physiological field processes which had been postulated as the basis of the whole gestalt process. Thus, in order to talk about higher-order processes from the field theoretical point-of-view one had to start with two important assumptions. First, one had to assume that the field-like qualities of gestalt configurations were actually a direct function of the brain. That is, the brain itself operates in a field fashion. Second, one had to extend that reasoning by assuming that other psychological processes, the higher-order ones, are also dependent upon the same brain function. Once this was done, all psychological processes could be seen as amenable to the descriptive principles which seemed to apply to pure perceptual phenomena.

Thus, while gestalt psychologists did not deny consciousness in theory, as Sigmund Koch says of the behaviorists, they certainly did "insult it in practice" since their principle of isomorphism implies some form of dualism but does not specify the matter clearly. Whatever the status of that philosophical issue may be, it is clear that for gestalt psychology consciousness is the isomorphic phenomenal counterpart of the basic field-like operation of the brain. Since physicists do not attribute any greater inherent freedom to fields than they did to the atoms which inspired the old view, it is reasonable and necessary to conclude that the "dynamic" operation of the gestalt brain is just as deterministic as the older traditions it sought to replace.

It should be noted that the criticism of the extensions of gestalt psychology which was made above, comes from utilizing the basic criterion that applications of the first principles of a scientific explanation must be done in a coherent fashion. Therefore, to imply that gestalt psychology provides any greater basis for either the existence or freedom of consciousness is an incoherency in terms of the doctrine. Similarly, to think one is doing a "gestalt therapy" by doing anything other than directly manipulating the character of psychophysical processes is also an inconsistency. These problems are examples of the problems he had in mind when in 1955 the physicist J. Robert

Oppenheimer told the American Psychological Association that he did not have the slightest idea of what a "psychological field" could be.[224]

Yet, with it all, there is a uniqueness in the gestalt doctrine since it is the first physicalistic psychology that we have seen which was not based directly upon the atomism of the entire era of modern science. In this light it forms a further example of the inversion of the concepts of matter and energy in which "mass becomes the name for a quantity of energy considered in relation to some of its dynamical effects," that Whitehead spoke of as the major metaphysical change which occurred in nineteenth century physics.

4.0.6 PSYCHOANALYSIS

Psychoanalysis is a very large and involved subject about which so much has been written from so many points-of-view that the subject almost seems to become larger with each attempt at description. Scientifically minded authors are often moved to decry the theoretical foundation of the system whenever they attempt to describe the character of the psychoanalytic system. The following is typical:

> Presumably the [psychoanalytic] theory exists in the collected works of Freud . . . but nowhere is there a clear statement of what are postulates, what are theorems . . . in short

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[224] J. Robert Oppenheimer, quoted in Marx and Hillix, Ibid., p. 180.

> one misses all the paraphernalia usually associated with a scientific theory.[225]

In searching for that scientific theory we would have to ask: Is it clear that psychoanalysis is another example of a physicalistic natural scientific theory? The answer to this question is an emphatic yes and this author considers himself fortunate to have come across a rather complete analysis of the psychoanalytic theory which was done from just this perspective. The following account of Freud's theory derives largely from the insightful work of Richard Lowry[226] and will focus upon the application which Freud gave to many of the same physicalistic concepts we have seen in other contexts.

Freud's first major theoretical work is a piece that was not published until 1954. This work was called Project for a Scientific Psychology in which Freud set forth a neurological model which was designed to account for the phenomena of memory, thinking, stress, pain, pleasure. When reviewing the character of the theory which Freud presented the modern neurophysiologist Karl Pribram concluded that many of Freud's ideas actually anticipated modern developments in neurophysiology, especially as concerns the

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[225] Marx and Hillix, Ibid., p. 230.

[226] See Lowry, Evolution of Psychological Theory, Chapters 8 and 9.

organization of the nervous system.[227] It is also in this work that the physicalistic bias of Freud's theory is the most evident:

> The intent of this project is to furnish us with a psychology which shall be a natural science: its aim, that is, is to represent psychical processes as quantitatively determined states of specifiable material particles and so to make them plain and void of contradiction.[228]

Freud elaborated that psychical processes were to be considered as a quantity of energy which was subject to the laws of motion and that the material particles were the neurons in the brain. The system which he created with these categories predicated that the functional unit of the nervous system as the neuron, which Freud also believed to be a distinct cell that had no connection with other cells. It was the character of these cells that they had a tendency to discharge energy--a process Freud called "the principle of neuronic inertia."

It was from this basic character of neuronic inertia that Freud derived the notion of primary and secondary processes. Freud theorized that as an organism grows in complexity there would be an ever increasing need to do two

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[227]Karl H. Pribram, The Neuropsychology of Sigmund Freud in Experimental Foundations of Clinical Behavior, A. J. Bachrach, ed. (New York: Basic Books, Inc.), pp. 442-468.

[228]Freud, quoted in Lowry, Ibid., p. 138.

things within the nervous system. One would be the discharge of energy from the neurons of the neuronic system. The discharge of this energy which had been generated by the internal needs of the body, hunger, etc., was the primary function of the neuronic system, hence primary process. On the other hand, there was also the need to store enough of this energy to meet the demands of life hence, secondary function and secondary process. The idea of storing energy led directly to the idea that there needed to be some sort of contact-barrier that would regulate the passage of energy. Thus some neurons were seen to be highly permeable (those functioned in perception) and others were highly impermeable and therefore functioned in memory.

With this basic theory Freud could develop explanations for such things as pleasure and pain, pleasure being the rapid discharge of large quantities of excitation whereas pain resulted from the rapid eruption of large quantities of excitation in neurons which were relatively impermeable. He went on to add that each of these experiences left behind a "residue" which was responsible for creating either an attraction or a repulsion for the memory images of the events which caused them.

By adding a few more explanatory hypotheses Freud came up with a system he could call "ego." On this view, ego was the organization of neurons of various permeabilities into distinct patterns such that they could control the flow of the energy involved in primary and secondary processes. Seen in this light, the ego's job is that of diverting excitation away from the hostile memory-images by the process of transferring it to associated neurons of more suitable memory-images. The net effect of this transfer was to "repress" the hostile image.

Adding all this up into one operating unit we have a picture of mental functioning which was built upon the idea of neuronic inertia which specified that neurons tend to divest themselves of energy. From this it follows that the primary function of the nervous system is to divest itself of this energy, saving only that amount required to meet the demands of life (secondary processes). Secondary processes were seen as the prime mechanism of self-preservation. The ego was the total of the various permeable and semipermeable neurons which had stabilized into rather permanent ways of handling and storing the psychic energy. In the process of this energy transfer it was possible for memory-images to attract and repell other memory-images and thus to repress them from consciousness.

Certainly the physicalism in this approach is obvious. From the initial statement of intent which appealed to the "general laws of motion" to the use of the concepts of attraction and repulsion of memory residues Freud, was, through and through, framing his theory of mental functioning by exact analogy to the physical sciences. Ultimately Freud came to abandon this approach and felt that it had been a total failure to attempt to bring a direct synthesis between neurophysiology and psychology. For the remainder of his career, and he had most of it left, Freud concentrated upon clinical studies. The interesting thing is however, that although this transition brought a change from neuronal to psychical systems, Freud still largely used the same theoretical framework in his explanations. A few examples from Lowry's treatment of the relationship should suffice to make the point.

In his first purely psychoanalytic work Studies in Hysteria on which he collaborated with another physician, Joseph Breuer, Freud undertook to describe his observations of the emotion laden hysterics who also were observed to have a considerable amount of unconscious information that could only be brought out under hypnosis. The interpretation he gave was entirely physicalistic. Thus, experience was seen to be some sort of excitation in the nervous system, whose task it was to discharge that energy through the mechanism of voluntary or involuntary reflexes. If this discharge is sufficient then all is well but if it is not then the remaining undischarged energy becomes "attached" to the memory and eventually can only get relieved by conversion into hysterical systems. Thus, we have the entire rationale for psychoanalysis:

> It will now be understood how it is that the psychotherapeutic procedure which we have described . . . has a curative effect. It brings to an end the operative force of the idea [the excitation] which was not abreacted [discharged] in the first instance, by allowing its strangulated affect to find a way out through speech.[229]

In his last major theoretical work, The Ego and the Id Freud sought to dispell some of the ambiguities that were in his system. He attempted to clarify the exact mechanisms of psychical processes by developing the concepts of ego, id and superego. These concepts compare favorably to the functions which Freud had assigned to the ego of his "Project" of 1895. Lowry notes that for some reason Freud had refrained from using the ego concept for many years, referring only to "conscious" processes instead.

The ego of 1895 had three basic functions: 1) to store energy (secondary process) for the purpose of coping with the demands of life, 2) to evolve various strategies for carrying out the coping behavior and 3) to repress the hostile psychical contents. In The Ego and the Id, Freud came up with the same breakdown of functions only this time he was referring to psychical apparatus and not neuronal apparatus. In this new view, ego got the job of "binding"

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[229]Freud, quoted in Ibid., p. 147.

energy for the purpose of coping with problems and also, the collateral task of mapping out the strategies for that coping behavior. The third aspect, super ego, came from Freud's long clinical observations to the effect that people had a certain resistance to getting too close to repressed materials. He established links from this repression behavior to what he thought were aspects of the person's bisexual nature that had been attracted and repelled during childhood by relationships with his parents. Out of this Freud derived the Oedipus complex and the idea of superego which was to have been the internal representative of the old external parental authority.

Thus, it is possible to make a strong case that Freud's theory is truly, in its inner most theoretical being, a physicalistic theory. However, in the application which Freud gave to that theory, he did something that no one had presumed to do before him. He literally took the theory directly into man's consciousness, and unconscious, and proceeded to set up explanations based on clinical experiences. Therefore, it is also possible to rather ironically assert that in its inner most psychological being, the theory is much like a human scientific theory. It is ironic because we also find that Freud completely retained the views of materialistic metaphysics while also being able to talk about the human person with his "purposes, intentions and aims."

Now that we have seen the basis of Freud's theorizing it is clear that he represents less of a radical change than did Dilthey and Brentano. As a matter of fact, Freud really did not represent a change in either the metaphysical or the epistemological approach to the conduct of psychology as a natural science. Also, it is quite true that his use of the basic physical theory in this way represents a disconnection of the first principles of the science of such great magnitude that one wonders if J. Robert Oppenheimer would not have excused the gestalt psychologists on the basis of a minor infraction.

4.1 THE AGE OF THEORY (1930-1950) AND CONTEMPORARY PSYCHOLOGY

As the various orthodox schools of psychology passed into history, the character of American psychology changed by becoming far more eclectic in its approach to theories, methods and concepts. The topics which came to captivate the attention of most American psychologists were of a much more circumscribed and restricted theoretical nature. These theories are often referred to as "miniature" theories which attempt to deal with very small aspects of behavior in ways that are not designed to last for much more than the duration of the immediate experimental context. It is also true, that a substantial portion of current research goes on in the total absence of any formal theoretical structure. The research simply goes from one topic to the next one that seems most plausibly based on the results of the former, or to the one which is most likely to get published, or to the one which is most likely to get funded, or all three, or any combination there of. In all, the dominant trend has been toward greater specialization by individual psychologists into narrowly defined areas which are concerned only with highly limited areas of behavior.

It was Sigmund Koch who coined the phrase "The Age of Theory" as a description of the rush toward maturity that followed upon the first three decades of adolescence which we have covered in the development of the "schools." Koch's major sentiment in the epilogue to the first three volumes of Psychology: A Study of a Science which he edited and from which the term "Age of Theory" is taken, was that, by the time of his writing in 1959, there could be found indications to the effect that:

> For the first time in its history, psychology seems ready--or almost ready--to assess its goals and instrumentalities with primary reference to its own indigenous problems. It seems ready to think contextually, freely, and creatively about its own refractory subject matter, and to work its way free from a dependence on simplistic theories of correct scientific conduct.[230]

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[230] Koch, Psychology: A Study of a Science (New York: McGraw-Hill, 1959), III, 783.

There is clearly a contrast between Koch's sentiments and those of the previous paragraph which suggest that a greater convergence on narrower doctrines is the outstanding characteristic of modern psychology. It is in this contrast that we can find the same distinction of psychology as a natural science and psychology as a human science that was useful in the middle of the nineteenth century. The one hundred years of progress which separates us from those initial beginnings has in many ways served to heighten the discrepancy between the two approaches. In addition, there is now a well identified dissident element in American psychology which is seriously questioning the motives and goals of the traditional approach to the science of psychology. We can therefore, most meaningly conclude our consideration of the development of psychology with an examination of these two major aspects of current psychological thought.

Turning first to the natural scientific trend in psychology, we can best describe the post-school period of development in terms of the various major varieties of theoretical emphasis which derived from the earlier monolithic schools. In addition, we should also point out that as the systematic importance of the theories themselves has weakened, the dominant focus has been to develop topical areas of research. We will cover both of these topics briefly; however, we can assert at the outset, that the type of fundamental change we are seeking, the change that would bring the insights of process philosophy into active concern in psychological thought, is not to be found in the extensions of natural scientific psychology. This limitation not withstanding, we can best explore the major varieties of psychological theories by categorizing them into three main groups. These groups are the various varieties of S-R Theory, Field Theory and Personality Theory. We should also note our bias that the transition from schools to theories to miniature theories to nontheoretical topical areas of research has done nothing toward improving the scientific status of psychology. The reasons for this bias are best shown in the actual history of the various schools rather than in an abstract criticism of selected theoretical issues. Accordingly, we will be able to use the various theoretical positions as a backdrop against which we can develop a general assessment of the whole movement.

4.1.1 STIMULUS-RESPONSE PSYCHOLOGY

Stimulus response theory has been developed in two main categories; the difference between the two lies simply in the emphasis which is placed on the process by which the stimulus is connected to the response. The best known group is called reinforcement theorists because the idea of a reward for activity is given central prominence as the main factor which accounts for newly learned behavior. The second major grouping of theorists are known as contiguity theorists because they stress that it is simply the contiguity between the stimulus and the response that is the so-called "reinforcing" aspect of the situation. In this approach one finds that a good deal of John Locke's associationistic psychology is alive and well and living in the twentieth century.

The reinforcement theorists mentioned above can be further divided into two groups and it is in these two groups that we will find the major conclusions we wish to draw from this aspect of psychological history. These groups differ on the role that reward is believed to play in the process of reinforcement. One group has focused on the relation of reward to the change which the reward causes in the organism's internal state and therefore defines reward in terms of drive reduction. The other group has been content to focus on reinforcement as an external fact and therefore has not been interested in dealing with the underlying nature of the process, a position popularly known as the psychology of the empty organism. The major figures associated with each of these positions are Clark Hull and his hypothetico-deductive psychology of drive reduction and B. F. Skinner and his psychology of operant conditioning. These are the two gentlemen we will use as the major examples of the predicament of modern psychological theory. In themselves they are perfect examples of a heavy handed deductive approach on the one hand and a rigidly conceived methodological approach on the other hand.

In order to make the difference between the two as clear as possible, it is necessary to introduce a few ancillary factors. Taking the hypothetico-deductive approach first, we need to clarify the nature of this type of approach. When we examine it we see that Hull created his system as a direct copy of those which had been highly successful in the physical sciences. It is a system which starts with formal postulates and their corollaries which in turn are used to deduce theorems. These theorems are then translated into empirical statements that can be tested experimentally. Should the deduction be confirmed in this manner all is well; however, in those cases where a discrepancy exists, the hypothesis of the experiment requires revision. From this, it is obvious that the final explanatory power of the system is going to depend directly upon the extent to which the first principles of the system include those aspects of human experience which are important to life. Should it happen that the basis of the system is defined in a fashion which is so narrow that it ignores most of the meaning of the subject matter, before the deductions have begun, then it is obvious that the explanatory power of any deduction in the system will also be limited to a subset of that original limitation. Thus, the proper first level question to ask of the Hullian system is, How inclusive are the first principles of the system? We will do this after we have considered the character of the Skinnerian approach.

The main characteristic of Skinner's psychology differs sharply from that of Hull. In Skinner we find an a-theoretical psychology. His main emphasis is on a descriptive approach to the acquisition of facts so that one can discover the empirical relationships which exist before any attempt is made to systematize them into a theory. In this insistence on factual behavior he also is against any sort of physiologizing, which is simply the attempt to explain behavior via a hypothetical internal state of the organism. The major question we need to ask of Skinner is, What are the empirical facts of behavior that are so important to building a proper psychology?

Now that we have the two crucial questions, we can ask them and then compare and contrast the results. As we do this however, we should reiterate that these are paradigm cases for much of modern psychology. Because Hull was historically first and also because his system has largely died out we should take his system first as a preparation for the reaction of Skinner to such approaches.

We said that we needed to know just how inclusive the first principles of Hull's system was. We can easily determine this by examining Hull's intentions. A rather complete statement of his formal position was contained in Hull's 1937 presidential address before the American Psychological Association. The title of this address was "Mind, Mechanism and Adaptive Behavior," and in it Hull dealt explicitly with each of the topics in the title. To Hull, mind was simply another name for the adaptive behavior of humans and animals. Since species are largely dependent upon their ability to adapt to their environment, "mind" is simply a name or inference which describes that very basic form of purposefulness. Thus mind became the operation of the second topic of the speech--mechanism. In this, Hull felt that the behavior of an organism is learned by the ultimate fate of the behavior itself. That is, a stimulus response bond is strengthened by a reinforcing state of affairs, and a reinforcing state of affairs is something that results in the reduction of a drive state. Thus, Hull created a system in which mind was just another name for adaptive behavior and adaptive behavior itself was something that was tied into very basic need satisfaction and survival requirements. Hull felt it was impossible to meaningly consider any reference to mind when the hard facts of adaptive behavior were before one's eyes.

Since this is the framework within which Hull chose to create his psychology, it would appear that there would be little room for anything other than totally determined behavior. Hull provided his view on this age-old problem in the last major theoretical publication of his career. He said:

> The reader has seen by now that the organism is here conceived as a completely automatic entity; that in our approach to behavior theory there is no entelechy, no disembodied mind, soul, or spirit which in some way tells the various parts of the body how to cooperate behaviorally to attain successful adaptation, i.e., how to achieve survival.[231]

We may now take these examples of Hull's approach to the study of behavior along with the hypothetico-deductive framework and ask ourselves what is likely to come out of that system that will be of use to anything other than similarly defined systems, since to argue a point of Hull's theory is to accept his premises and to throw away the most meaningful aspect of man--his consciousness.

Before closing accounts with Hull we can add two things. First, one should not shut the door completely on the possibility that some useful data might come directly from Hull's approach or those which have the same general form. We say this in the same way that we said that Freud's

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[231]Clark L. Hull, A Behavior System (New Haven: Yale University Press, 1952), p. 347, quoted in Lowry, op. cit., p. 201.

psychoanalysis had managed to generate a description of man's conscious life that in spite of its fundamentally mechanist orientation was able to capture something of the pervasive spirit of what it is to be human. Similarly, we can say of hypothetico-deductive systems that they may do the same thing but we should also observe that such gains by either system can only come about as a result of an arbitrary disconnection of the conclusions and the basic premises of the system. At some point, in the development of each topic, levels of meaning in excess of those contained in the original premises must be introduced in order to add the additional content. Since this is the case, there is no way around the realization that such additions also constitute an incoherence in the system. Thus, we have meaning and psychological relevance only at the expense of logical incoherence. The psychology which results from these efforts is perhaps best described as a psychology because of incoherence rather than a psychology of incoherence; but, in any case, there is really no way around the realization that the exactness of the system is a sham if it is also co-defined as insuring a meaningful psychology.

Turning to Skinner, whose system we have labeled a methodological approach in contrast to a theoretical system like Hull's, we need be concerned with the empirical facts and empirical relationships he hoped to discover by virtue of his methodology. One must say that Skinner's atheoretical approach to psychology is really a theory about not having a theory in which he can derive the same sort of security from methodology that Hull did from the formal logical nature of his system. As we have already seen, Skinner can be meaningly criticized for ignoring the role of his own subjective intentions as the main determinants in guiding him to the atheoretical position he assumed. It is also true that there is nothing in his writings that suggests any concern about the atomism and mechanism of natural scientific approaches to the study of man. In fact, his approach is exactly in line with the main stream of natural scientific thought. That is to say, Skinner's basic assumptions are that one should seek to determine the individual and clear-cut responses which can be directly manipulated by various schedules of reinforcement and to further define these responses as the basic facts of an empirical, atheoretical psychology.

So, just what are the empirical facts that are important to the creation of the behavioral psychology that Skinner would have us adopt. Skinner maintains that these facts are the facts which one can determine by the methodological approach which is based upon the study of a freely operant form of behavior and then subsequently demonstrating that the behavior itself is dependent upon the result of the behavior, i.e., does it produce a reward. The scientific credibility of this approach is buttressed by the use of an elaborate laboratory environment in which animals can be placed in precisely controlled conditions and then subjected to various conditions of reinforcement under elaborate methodologies. The types of operant behavior most frequently studied in this type of experiment has been bar pressing in rats and key pecking in pigeons.

Since Skinner believes that his method is producing basic empirical facts of animal behavior there is an ever present tendency to generalize the findings to all levels of everyday-life situations of humans. Today, the world is filled with this sort of spin-off from Skinner's behaviorism and the diverse areas of social control, education, mental health, technical training and animal training all seem to be not only amenable to but also explained by the simple facts of Skinnerian psychology.

What then is to be said of Skinnerian psychology in terms of the need to understand man's higher-order human characteristics? First, we can assume since Skinner does not specify any rejection of the standard assumptions of atomistic and mechanistic science that he is in complete harmony with that approach. On this point, we note with interest that his 1957 volume called Schedules of Reinforcement is a work in which the results of over 70,000 hours of continuously recorded data relating to over 250 million responses of individual pigeons is presented.[232]

One could hardly believe that a human being could muster the sort of commitment and energy to produce a compendium of this magnitude if there was not a basic belief in the certitude of the approach. Second, and most important, we can explain the apparent utility of the behavioral approach in psychology in the same fashion that we were able to summarize both Freud's and Hull's contribution to the understanding of man's nature. To repeat slightly, we have asserted that the real human meaning which could come from those systems had to be of a rather ad hoc nature. That is to say, because the first principles of the approach were a direct function of a mechanical cosmology in which life itself is somehow explained away as an epiphenomenon, there was no way which the issues of human freedom and dignity could be addressed from within any system which was limited to those abstractions. The result was that one essentially had to smuggle in those aspects of human character that were expressed in the system. Now, let us look at Skinner's psychology. Skinner's atheoretical approach really only specifies a methodology and the fact that it can be applied in a wide variety of situations is a testament to its free

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[232]Skinner and C. B. Ferster, Schedules of Reinforcement (New York: Appleton-Century-Crofts, 1957).

floating nonsystematic nature. Thus, in order to be of any use to human situations, the system must be cloaked in the relevance which people bring to the situation. It matters not whether one is a humanist or a facist, a theist or an atheist, the principles of behavioral methodology can operate to manipulate some forms of behavior but then, so do voodoo dolls and the incantations of medicine men.

In forming these conclusions about Skinner's system, we must also slightly shift the basis of our argument from what it was with Freud and Hull. Those earlier attempts wanted to derive behavior from theory and hence to explain it in the sense that Dilthey used the term. In Skinner's psychology, we really have something quite different, in place of explanation we really have something approaching a descriptive form of psychology but a seriously circumscribed effort at description. Skinner would have us believe that the meaningful universe of human behavior is to be explained in the same type of terms that he found to be applicable in the limited four-walled universe of rising and setting reinforcement bars which he created for the study of animal behavior. Even if he created this world in six days and rested on the seventh, there is no way to escape the obvious fact that any methodology, and especially one as limited as this one, can only serve the purposes of its creator. The essence of our argument is that we need a view of psychology which itself recognizes and makes explicit the purposiveness of human behavior. Since Skinner effectively assumes this by being atheoretical he has allowed many others to assimilate his doctrine to their own purposes. In many ways the effect has been salutary; however, only at the expense of making a complete muddle out of the possibility of achieving a more useful and truly scientific study of what it means to be human.

There remains one major type of S-R theorist to discuss--the so-called contiguity theorists. Contiguity theory as we have said is essentially a replay of Lockean associationism which is however devoid of its philosophical context. As one might expect, a twentieth century version of this theory will usually find itself couched in a mathematical or probabilistic context rather than a philosophical context. Seen in this light, the simple idea of an S-R connection is just the kind of unitary thing about which abstract mathematical treatments can be built. A main effect of the added mathematical sophistication has been to mitigate to some extent the compulsive determinism of many of the older views. In this more modern case, we find behavior considered as a probabilistic rather than determinant function of the mechanical stimuli which impinges on the organism. Thus, while a statistical learning theory may allow the organism to sample the stimulus field before the response is decided upon, that sampling procedure is, none-the-less, constrained to be a random process. Since randomness is not equivalent to purposiveness, one can expect to find little except "random" flashes of insight within the "purposive" framework of statistical learning theory.

4.1.2 FIELD THEORETICAL PSYCHOLOGY

The next major variety of theory to be considered is Field Theory. Since we have already covered the status of the field interpretation in Section 4.0.5 in connection with Gestalt psychology we need not reconsider it at this point. Since there is a close relationship between modern field theory and classical Gestalt psychology, we find field theorists focusing on the role of the totality of events in the organism's environment as the important fact of behavior. The different field theories have simply differed on the role of these factors without also questioning the basic field concept or arguing it among themselves.

The two most important names in this area are Kurt Lewin and Edward Tolman. Lewin's use of "field" is typical of the later stages of most of the developments which followed upon the doctrinaire positions of the "schools." Lewin modified the key Gestalt doctrine of Isomorphism by thinking of the environment and the individuals in it as a field. Even though this meant that field was now a sociological rather than physiological concept, Lewin thought it had important explanatory characteristics:

> The possibilities of a "field theory" in the realm of action, emotion, personality are firmly established. The basic statements of field theory are that a) behavior has to be derived from a totality of coexisting facts b) these coexisting facts have the character of a "dynamic field" in so far as the state of any part of this field depends on every other part of the field. . . . According to field theory, behavior depends neither on the past nor on the future but on the present field. . . . This is in contrast both to the belief of teleology that the future is the cause of behavior, and that of associationism that the past is the cause of behavior.[233]

From this, it is clear that Lewin intended a rather metaphorical use of field but was none-the-less willing to truncate man's relations with the past and anticipations of the future by allowing the field concept to introject the idea that the forces which determine a physical field are obviously immediate and causal. However, it is also true that by viewing field in this way Lewin was able to overcome many of the limitations of atomistic views and as a result found many new and exciting areas of experimentation and theorizing open to him.

We will not cover the explicit character of his psychology at this point and will only have opportunity to mention aspects of it in later sections. In the present

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[233]Kurt Lewin, Formalization and Progress in Psychology, University of Iowa Studies in Child Welfare, XVI, No. 3, 33, 36 quoted in Robert S. Woodworth and Mary R. Sheehan, Contemporary Schools of Psychology (New York: The Ronald Press, 1964), p. 241.

context he is a prime example of an important characteristic of modern American psychology. We have already mentioned the fact as the original systematic position has softened, the subsequent popularizers often transport the concept into areas for which it has no other validity than the fact that it sounds good. Sounding good and making plain sense is obviously an important characteristic of any doctrine; however, it does become quite confusing to someone trying to make sense out of the scientific status of the resultant and J. Robert Oppenheimer seems to be a good example as we have mentioned. Lewin's use of the field concept fits this category perfectly.

Tolman made much less use of field theoretical concepts than Lewin. Tolman's system is known as a purposive behaviorism because he felt that a role for cognitive expectancy was required in a description of behavior. His focus on cognitive aspects of behavioral situations provided a stark contrast to Hull and his followers and has led to many new and varied research problems. It should also be pointed out that Tolman was a so-called "rat psychologist" because he felt that it was possible to study "most of the underlying laws of intelligence, motivation and instability" in rats as well as men.[234]

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[234] Edward C. Tolman, A Stimulus-expectancy Need - Cather's Psychology, Science (1945), CI, 166 quoted in Marx and Hillix, op. cit., p. 288.

Tolman's emphasis on the cognitive role in behavior led him to the development of the concept of intervening-variable and also to the formulation of the distinction between learning and performance. Both of these concepts have received wide recognition in circles concerned with psychological theory. The intervening variable was a highly useful device for Tolman because it is a hypothetical intra-organismic function that can be used as a sort of summary for one's intuitive feelings about the reasons for a particular kind of behavior. While this can be a useful approach it is clearly open to great abuse if taken too seriously or used too freely. Had we gone into the details of Hull's learning theory we would have seen both styles of this abuse which followed from Hull's adaptation of this aspect of Tolman's theory.

Tolman's distinction between learning and performance has been an important theoretical tool because it permits the experimenter to recognize that the animal's motivational status is also important in behavior. In itself it represents a shift from the purely machine-like analogy of learning processes. It also sparked vigorous debate between Tolman and Hull due to the fact that Tolman's formulation of cognitive factors and motivation as distinct from performance were exactly contrary to Hull's position which was asserting that drive reduction produced by reward was the efficacious factor in learning.

We can conclude this very limited treatment of field-like theories in modern psychology with a few general remarks relating to the character of field theory as contrasted to the older S-R and associationistic approaches. Obviously, the natural bias that one finds in the field concept toward the appreciation of fields of organization creates a basic shift away from focusing on discrete elements and connections. In some very important ways, the two alternative approaches form an interesting complement for each other. Since the traditional approach had been so intent on the peripheral aspects of behavior, the field oriented theorist with his concern for perception and cognition tended to provide a needed corrective influence in the direction of psychological thought. Thus, Lewin could open up the new areas of personality and group-dynamics and Tolman could, for the first time in theoretical psychology, find room for the concept of purposiveness as it relates to actual observed behavior.

We can therefore conclude that the advent of field theoretical constructs had, and is still having, an important effect on the breadth and depth of psychological theory. We must also note however, that since the field theory is essentially a metaphor which produces useful approaches to various phenomena, it will continually be diluted by inappropriate applications which totally divorce the concept from its first principles and therefore actually do a disservice to the cause of psychological theory. As we have seen in this section, there is no direct relationship between the Gestalt theoretical physiological field in even the most orthodox modern psychological field theorist, Kurt Lewin. As a matter of fact, Lewin explicitly modified the Gestalt concept of Isomorphism and spoke of "field" rather than field as the Gestalt psychologists had done. Our opinion is that a truly scientific psychology cannot be built upon a system of thought which is made incoherent by such separations between theoretical statements and the first principles upon which they rest. We will further assert that the ultra-modern trend of shifting to forms of cognitive theorizing which are increasingly based on computer models of thinking processes has done little more than to teach and old dog new tricks. Also, the closely associated developments in ever increasingly sophisticated experimental techniques, while they may dazzle the world and make an apparently rigorous curriculum for graduate students, are themselves limited to the analysis of the new tricks that we would attempt to teach the old dog. The further operation of this form of theory development and escalation of experimental techniques can do nothing therefore except blur the already vague and hazy distinction between the concepts which separate the different divisions of psychological thought. One might gratuitously call this sort of development eclecticism but in reality it only amounts to the gradual grinding down of differing shapes and sizes of ideas into a homogeneous mass of minute data which is unified only in the fact that its parts are in no way diverse from each other.

4.1.3 PERSONALITY THEORY

The last major variety of modern theory to be considered is personality theory. We are going to defer treatment of the more organismic aspects of personality theory until they can be considered in the context of the Whiteheadian organismic approach to personality and will therefore, following a brief over-view, only consider the more mechanistic types of personality theory in this section.

The general class of theories that have attempted to focus on the issue of personality are primarily noteworthy in that the nature of their subject matter has caused them to be much more complete than those theories we have considered to this point. Personality theorists have, in general, recognized the functional autonomy of individual personalities and have been willing to admit such factors as survival, adaptiveness, purposiveness and motivation, as important aspects of the whole person in his natural habitat. This emphasis on real aspects of whole people in natural environments is obviously anathema to the traditional psychological theorist who tends to specialize in the hypothetical mechanisms underlying narrow aspects of statistical subjects in a highly specialized laboratory environment. It is hardly surprising that one finds such little commerce between the two approaches. It is also interesting to note that some of the outstanding developments in psychological theory have, none-the-less, come from those who indulged in the theories which are closely associated with human life as it is lived. Sigmund Freud is the outstanding traditional example of this category and in modern times we can perhaps turn to Gordon Allport for the impetus toward a new view of psychology. We will have more to say about Allport's role and the movement of which he was a member in the conclusion to this section after we have considered those types of personality theory which are closest to traditional psychological theory.

The outstanding example of a personality theory which includes both a traditional stimulus response orientation and a psychoanalytic orientation is to be found in Neal Miller and John Dollard's use of the overarching scope of psychoanalytic theory as the vehicle in which to transport the highly restricted independent and dependent variables which are found in S-R theory. They chose to use Hullian theory both because of its elaborate structure and because they felt that there was some basic similarity between key portions of the two theoretical structures. For example, Freud saw an important organismic role in the process of tension reduction (pleasure) and Hull's central notion was the idea of drive reduction (reinforcement), as the effective stimulus in learned behavior. Hull also developed numerous intervening variables to deal with such things as the build-up of inhibition as a result of practicing the same task and this type of concept seemed to fall fairly well in line with Freud's ideas on repression.

Thus, with Hull's theory as the methodological model and Freud's psychoanalysis as the content model, Miller and Dollard set out to produce a theory of personality. They developed a behavioristic account of the development of learning of a neurosis and also saw its cure during the process of psychoanalysis as an "unlearning" or relearning of something more functional. In addition to this small example, their work has probed into many areas of psychoanalytic theory and also has produced feedback into Hullian theory which Hull himself adopted as a meaningful addition to his theory.

Miller and Dollard's work can be seen as an expression of the need to find a complete context into which the numerous partial psychologies of the various branches can be integrated and also, to find a way to bring the more global concepts of personality theory to some meaningful experimental test. As important as this attempt has been it seems to have died out as an active line of research and its creators have become occupied with other areas of research. We might point out in passing that as important as synthesis is, whatever problems are common to both systems in the synthesis will also be common in the resultant. In this case, since both Freud and Hull shared the mechanistic model then we can expect a mechanistic resultant.

Another attempt at the methodological production of personality theory has been the use of the factor analytic approach to the analysis of data which are thought to bear some important relationship to personality. This trend is a direct spin-off of the factor analytic methodologies which were developed to analyze the statistical characteristics of intelligence tests. The idea is to obtain data on a large number of measures from a large number of people and then to correlate each measure with every other measure so that the common factors which account for most of the observed variance can be found by the process of factor analysis. Factor analysis is a highly complex and extremely cumbersome technique that, were it not for the modern computer, would not find nearly as much use as it does.

From this it is easily seen that the particular content of the personality theory which is based on a factor analysis is little influenced by the analytical methodology. As long as some numerical representation can be achieved for the data one thinks relevant, then a factor analysis can be performed. To date, even though there are factor analytic personality theorists of widely recognized status, this sort of approach has only demonstrated its ability to analyze factors which are contained within the inclusiveness of the theorists' formulations. Like behavioral techniques, factor analytic methodology will serve any master who can master its technique.

4.1.4 HUMANISTIC PSYCHOLOGY

At this point, rather than going into the various types of organismic, analytic and self-theories of personality, we will leave those details for later discussion and conclude our consideration of the development of psychological thought by considering the rise of the newest self-proclaimed factor in the history of psychology. We are referring to the gradually increasing level of criticism which has arisen since the early 1950's which has called itself a movement toward humanistic psychology. The champions of this young revolt that seeks basic reform in psychology have been men like Gordon Allport, Abraham Maslow, Gardner Murphy and Carl Rogers.

The strongest bond of unity in the whole movement has been a reaction to the narrow artificiality of the traditional approach to understanding man. Laboratory studies and emphasis on animal behavior fail, they assert, to encompass those aspects of man, his highly subjective qualities and capacities, which set him apart from the rest of animal life. Humanistic psychologists are not reductive analysts who think that the beauty and complexity of human life is somehow synonymous with beautifully executed and elegant laboratory experiments. Such efforts they feel have added little to our understanding of man.

The humanistic view point has not attached its goals and aspirations to some new theory or even methodology which is to become the panacea for the ills of contemporary psychology. Rather, the humanist movement is an effort to reorient psychological thought so that it takes account of the same sort of factors that we have seen to be the concern of the originators of human scientific psychology in the middle of the nineteenth century. The first president of the American Association for Humanistic Psychology, J. F. T. Bugental, included the following sentiments in his presidential address given in 1962.

> Humanistic psychology has as its ultimate goal the preparation of a complete description of what it means to be alive as a human being. . . . Such a complete description would necessarily include an inventory of man's native endowment; his potentialities of feeling, thought, and action; his growth, evolution, and decline; his interaction with various environing conditions . . . the range and variety of experience possible to

> him; and his meaningful place in the universe.[235]

While such sentiments are, for humanistic psychologists, something of an orienting goal rather than an envisioned attainment, the humanists are, none-the-less, vitally concerned with experience as it relates to those aspects of daily living which are important to the process of life and are quite willing to talk about issues such as love, purpose, fear.

One of the earliest champions of the movement, Abraham Maslow, coined the expression "third force" as a characterization of those psychologists who see psychology as "holistic rather than atomistic, functional rather than taxonomic, dynamic rather than static . . . purposive rather than simple-mechanical."[236] On this interpretation, one could perhaps go back to the publication of Koffka's Gestalt Psychology in 1935 or perhaps even Lewin's A Dynamic Theory of Personality also published in the same year, for the antecedents of the latter day "third force" psychologists. However, the field theorist revolt against the atomistic and associationistic psychologies of old is not the same as the emphasis which is found as the common

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[235]Bugental, The Challenge that is Man in Challenges of Humanistic Psychology, Bugental, ed. (New York: McGraw-Hill, 1967), p. 7.

[236]Abraham Maslow, Motivation and Personality (New York: Harper and Row, 1954), p. 27.

thread that binds the humanistic psychologists together. The "third force" people share a common position in their concern for the unity of the human person--the person and his problems as they are manifest in the webs of life's interrelationships. Nevitt Sanford's often referenced article says of this movement:

> The critique is not of the experimental approach in psychology or of general psychology as a discipline; it is of a state of affairs in which the advocates of a particular kind of psychology--psychology-without-a-person--have been able to gain power through putting across the idea that they are the representatives in psychology of true science.[237]

Although Koch has stated the position negatively to the effect that the central factor in the "third force," a term which is an unhappy metaphor to Koch, is nothing more than "a feeling of disaffection from the emphases of recent American psychology,"[238] the central position of the whole movement was eloquently and succinctly stated by Carl Rogers as a problem relating to which philosophical view of man is chosen as the basis for one's theoretical framework:

> Each current psychology has its own implicit philosophy of man. Though not often stated explicitly, these philosophies exert their

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[237] Nevitt Sanford, Will Psychologists Study Human Problems?, American Psychologist (1965), XX, 193, Sanford's emphasis.

[238] Koch, Psychology and Emerging Conceptions of Knowledge as Unitary in Behaviorism and Phenomenology, Donald T. Wann, ed. (Chicago: University of Chicago Press, 1964), p. 44.

> influence in many significant and subtle ways. For the behaviorist, man is a machine. . . . For the Freudian, man is an irrational being, irrevocably in the grip of his past and the product of that past, his unconscious.
>
> It is not necessary to deny that there is truth in each of these formulations in order to recognize that there is another perspective. . . . [Man] is a person in the process of creating himself, a person who creates meaning in life, a person who embodies a dimension of subjective freedom. He is a figure who, though he may be alone in a vastly complex universe and though he may be part and parcel of that universe and its destiny, is also able in his inner life to transcend the material universe; he is able to live dimensions of his life which are not fully or adequately contained in a description of his conditionings or of his unconscious.[239]

We agree with Rogers' contention that the problem lies in the choice of a proper philosophy of man as the basis for psychological theorizing. However, it should also be evident that our view as to what constitutes the proper philosophy of man differs rather distinctly from that generally found in the traditions of regular psychology or, for that matter, humanistic, "third force" psychology. It is clear from the preliminary sketch of the philosophy of organism and some of its implications for psychological theory which were presented in Section 3.3 and also from the "third force" psychology mentioned above, that it is the central concern for the individual human, for a psychology-with-a-person, that marks the main point of

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[239] Rogers, Toward a Science of the Person in Wann, ed., Ibid., p. 129.

similarity between the two approaches. However, we can also push the similarity a little farther with the recognition that the dominant theoretical framework for many humanistic psychologists is the existentialist perspective which itself is an outgrowth of the phenomenological school of Husserl and Brentano--two individuals that we were able to place in close contact with the development of psychology as a human science in the middle of the nineteenth century.

In some very important ways, modern psychology has come full circle. In a limited frame of reference, one can say that there is a return to the earlier thought of Dilthey and Brentano. In a much more inclusive frame of reference, one can say that in some very important ways western thought is once again asserting man to be the pinnacle of sensitivity and the essence of the evolving cosmos. The philosophy of organism, because of the fundamental difference in its basic metaphysical postulates offers a true alternative to the problems which face those who seek human meaning in scientific psychology. We can state the central issues involved in the need for a basic change in the metaphysical approach in a few central factors as follows: First, as we have seen, the development of the various types of psychological theory which has taken place since the middle of the nineteenth century, has been overshadowed by the use of the natural scientific model as the paradigm for psychological theory. Second, since progress in science is usually thought of as growth toward new abstractions that have larger explanatory power, a unifying theory in psychology will have united what is of value in each of the several highly specialized areas of psychology. Third, since it is an impossibility for the unifying principles, which must have a larger generality, to come from within any of the narrower specialized fields of psychology (the whole is greater than the part), some new solution is required to yield the guiding principles for the unification of psychological thought. Fourth, since the various specialized fields of psychological thought, whose history has been covered in these chapters, all share the common parentage in the Galilean/Newtonian paradigm, the only place principles of greater generality can be found is in a system of thought which is more general than the basic metaphysical categories of the atomistic and mechanistic universe that has existed for the last three hundred years. Fifth, the philosophy of organism is the only system, yet devised, that speaks to these issues in a coherent and applicable fashion.

Gordon Allport has stated the issue in a way that places the problem directly upon the threshold of the philosophy of organism. Speaking of the <u>inversion</u> in our logic which is caused by excessive particularism Allport says:

> All analogies and models are derived in the first instance from a perceiving and cognizing mind. It is from our own experience with our regulatory process that we derive the idea of regulatory systems in both animate and inanimate nature. The analogy we create does not include the creator. Rather the analogy is dependent upon (is an aspect of) the creator. Thus it is only <u>aspects</u> of our total life that are like computers, like biochemical compounds, rats in a maze, or like the social behavior of insects. It is only the tail aspect of an elephant that is like a rope.[240]

As we have seen, the philosophy of organism is a system which precisely accomplishes the task of creating an "analogy" which <u>does</u> include its creator and because of this fact, provides an answer to the enigma which has faced anyone who sought to find a more general unifying solution for the various specialized approaches to the psychological study of man. Allport put his finger directly on the problem when he said.

> The truth is that we can never have a fully systematic eclecticism until we can resolve the two central antimonies--the issue of dualism and the problem of purpose.[241]

With this, we can bring this lengthy consideration of historical issues to a close. Those who agree with Allport's sentiment in the quotation immediately above, must

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[240] Gordon Allport, <u>The Fruits of Eclecticism: Bitter or Sweet?</u> in <u>The Person in Psychology</u>, Allport, ed. (Boston: Beacon Press, 1968), pp. 13-14, Allport's emphasis.

[241] <u>Ibid</u>., p. 19.

also recognize that the issue of dualism and the problem of purpose are not simply problems for a meaningful eclecticism in psychology, but are, rather, issues which are endemic to the entire tradition of modern science.

We began Chapter One, and this excursion through psychological history with the assertion that the whole of the movement toward science, was itself, based upon the centuries long tradition of revealed religion and faith in the order of nature. This faith, which was seen to be "an unconscious derivative from medieval theology," was not simply the faith of the church but instead was the faith that "springs from direct inspection of the nature of things as disclosed in our own immediate experience." In the continuation of this thought, Whitehead went on to assert, "To experience this faith is to know that in being ourselves we are more than ourselves: to know that our experience, dim and fragmentary as it is, yet sounds the utmost depths of reality: to know that detached details merely in order to be themselves demand that they should find themselves in a system of things: to know that this system includes the harmony of logical rationality, and the harmony of aesthetic achievement: to know that while the harmony of topic lies upon the universe as an iron hand necessity, the aesthetic harmony stands before it as a living ideal moulding the general flux in its broken progress towards finer subtler issues."[242]

Now that we have come to the end of the hundred-year odyssey that began with the awakening of a new awareness of detached details which wanted to find themselves in a system of things, and which eventually did find themselves in a system of logical harmony and aesthetic achievement, we are, once again, in possession of many new facts which appear to contravene the iron hand necessity of the old system. In this sense history has repeated itself, for we are midst of a new era of detached details in which the ablest tool man has to apply to the task of renewing his vision is that same faith that springs from direct inspection of things as disclosed in our own immediate experience. We must, once again, have the faith that the only thing which can cement the detachment of novel detail into the validity of logical rationality and aesthetic achievement is our own experience, dim and fragmentary thought it may be, since in all the world, it is only in the shadow of man's image that there can be any change in the general flux toward finer subtler issues.

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[242] Whitehead, Science and the Modern World, p. 18.

CHAPTER FIVE

5.0 TOWARD AN ORGANISMIC PSYCHOLOGY

The purpose of this chapter is to explore ways in which the relationship of psychology and science can be clarified and also to extend these considerations by attempting to establish a connection between them and philosophy. This treatment, from which there seems to be no retreat if the type of problem encountered as a result of interpreting psychology as a human science is to be meaningly treated, will explore the ideal of bringing the three separate areas of discourse into a joint contribution toward increased human understanding. It should also be added that this does not entail seeking to amalgamate these separate disciplines into some new discipline; rather, we shall simply attempt a coordination of basic ideas such that each discipline can make its maximum contribution to the others with a minimum of infringement. Since we are suggesting that the changes which might result from this analysis will be the greatest in psychology, we will discuss it last after first presenting our position on the character of science itself and following that with an introductory defense of the Whiteheadian metaphysical philosophy which is our primary philosophical orientation.

5.1 THE CHARACTER OF SCIENTIFIC KNOWLEDGE

"Science is the attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform system of thought. In this system single experiences must be correlated with the theoretic structure in such a way that the resulting coordination is unique and convincing." This was Albert Einstein's opening paragraph of an essay he wrote in 1940 in which he undertook to explain the attempts he was making toward finding a unifying theoretical basis for the various separate and specialized fields of physical research. He continued:

> The sense-experiences are the given subject-matter. But the theory that shall interpret them is man-made. It is the result of an extremely laborious process of adaptation; hypothetical, never completely final, always subject to question and doubt.

According to Einstein, the scientific way of forming concepts does not differ significantly from the methods which are used in daily life. One finds that the scientific enterprise is simply a "more precise definition of concepts and conclusions" with the ultimate goal of reducing "all concepts and correlations to as few as possible logically independent basic concepts and axioms."

In this light, science is seen to be simply a specialized form of human activity that also happens to have its own methods, goals and characteristics. Important for the present context is the idea of sense-experience as it

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[243]Albert Einstein, <u>The Fundaments of Physics</u> in <u>Readings in the Philosophy of Science</u>, Herbert Feigl and May Broadbeck, eds. (New York: Appleton-Century-Crofts, 1953), p. 253.

underlies the processes of building a body of interpretative theory. At this very preliminary level we must be careful not to assume a highly abstract definition of sense-experience. Obviously, we are on guard against the type of interpretation that was basic to Wundt's elementism and are searching, instead, for a definition that will contain a larger meaning. Phillip Frank has observed that science actually deals with two distinct poles of experience which are formed by the contrast between commonsense experiences (direct observations) and the general principles that seem to apply to them. To Frank:

> The central problem in the philosophy of science is how to get from commonsense statements to general principles.[244]

We would therefore, like to insure that the sense-experience which goes into psychology as a human science retains the meaning of a commonsense, experiential term which is used in the "extremely laborious process" of forming an interpretative adaptation or theory. In this same vein, Werner Heisenberg has asserted that the concepts of natural language, even the vague ones, are more stable in the expansion of knowledge than are the precise terms of scientific language since these latter terms derive from an idealization stemming from limited groups of phenomena. The

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[244]Phillip Frank, Philosophy of Science (Englewood Cliffs, N. J.: Prentice-Hall, 1957), p. 2.

concepts of commonsense natural language are, by contrast, formed in immediate experience with reality and therefore represent reality. It is this immediate contact with reality which is lost when the scientific attempt is made to get a closer correspondence with a more defined aspect of nature. Heisenberg believes that it is the intrinsic stability of natural language that accounts for the fact that after the nineteenth century belief in the scientific method and precise rational terminology had passed away, we find new versions of the age-old concepts of life, soul and God which seemed to have had no place in the circumscribed skepticism which characterized the closed frame of scientific thought. In this, Heisenberg feels that modern physics, by its dissolution of rigid concepts, has perhaps opened the door to a wider outlook on the relation between the human mind and reality.[245] On this same point, Michael Polanyi asserts:

> There is in fact no aspect of sciences, including even mathematics, in which the fundamental presuppositions, the methods of investigation and the criteria used for verification have not undergone a series of marked changes since the inception of modern science 300 years ago.[246]

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[245] Werner Heisenberg, Physics and Philosophy (New York: Harper and Row, 1958), pp. 196-202.

[246] Polanyi, Science Faith and Society (Chicago: University of Chicago Press, 1964), p. 89.

5.1.1 OBSERVATION AND INTERPRETATION IN SCIENCE

It is these latter aspects of the scientific enterprise which form its "never completely final" and "always subject to question and doubt" character that warrant the greatest attention in the present context. We are concerned with the path between the two poles of data and interpretation, of internal realization and external description, and can make several basic observations about the nature of the "rites of passage" which are appropriate to theory formulation.

First of all, we have the following statement by Polanyi which seems clear enough in light of the history presented in earlier chapters:

> Every interpretation of nature, whether scientific, nonscientific, or anti-scientific, is based on some intuitive conception of the general nature of things. . . . The premises of science on which all scientific teaching and research rest are beliefs held by scientists on the general nature of things.[247]

There is, in fact, a certain background of presupposition in anything we do. To perceive is to select and to abstract in accord with our conceptual framework; this amounts to a complex interaction between the mind and its object. This vital aspect of discovery in science, is a part which is usually lost in idealized accounts of the scientific method

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[247] Ibid., p. 38.

or in the cut and dry procedures established by a teacher for the "discovery" of the objective of the lesson. This selective interpretation shows the subjectivity of the scientific enterprise. It is also a subjectivity in which the complexity and focus of the interaction is under the direct influence of the orientation of the observer. Of this influence, Jacob Bronowski has written in another but related context:

> For relativity derives essentially from a philosophic analysis which insists that there is not a fact and an observer but a joining of the two in an observation. This is the fundamental unit of physics. The actual observation. And this is what the principle of uncertainty showed in atomic physics: that the event and the observer are not separable.[248]

At the very basis of science itself then, is the perceptive, presuming and inquiring mind of the scientist. The true picture of this enterprise is far different than that which usually evolves from more positivistically oriented accounts which look to the collection of pure facts and see theory as simply a convenient way of classifying those facts. The problem with this approach is that it fails to recognize the role of the creative intelligence of the scientist because that sort of data has been excluded as irrelevant by the narrowness of the presumptions on which the theory rests

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[248] Bronowski, The Common Sense of Science (New York: Harper and Row, 1960), p. 175.

and it is difficult in the extreme to disprove a theory with data which the theory rejects as irrelevant.

This leads directly to a second important character of modern science. In the tradition of scientific thought there have been two main approaches toward the production of theoretical accounts of nature. Barbour summarizes them succinctly in terms of the Baconian inductive ideal and the Popperian deductive ideal.[249] In the case of the traditional Baconian method, collecting data and cataloguing facts were seen as the main stays of scientific advance. These inductive procedures were thought to simply involve the generalizations necessary to interpret the data and failed completely to recognize the fact that hypotheses are not simple summaries of the data but in fact are mental constructs that have an entirely different status than the simple data. The deductive approach in science which develops much later, arose as a reaction to the assertions of the pure inductive method because there was often no observable way that the inductive statements could be tested or disproven. This approach recognized the hypothetical character and different logical status of theory and observation and prescribed the opposite of the inductive approach namely, that the general theoretical statements should generate testable hypotheses. In this case, we can

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[249] Barbour, Issues in Science and Religion, pp. 142-143.

find useful data on how theories are to be tested but very little insight into how they are created. Thus both common approaches to theory formulation are decidedly naive as regards the actual role of the creative leap of imagination which is required for the production of theories. Of this type of behavior in which there are many important parallels to artistic creativity Norman Campbell has written:

> For it has been admitted that through discovery of laws depends ultimately not on fixed rules but on the imagination of highly gifted individuals, this imaginative and personal element is much more prominent in the development of theories; the neglect of theories leads directly to the neglect of the imaginative and personal element in science. It leads to an utterly false contrast between "materialistic" science and the "humanistic" studies of literature, history and art. . . . What I want to impress on the reader is how purely personal was Newton's idea. His theory of universal gravitation, suggested to him by the trivial fall of an apple, was a product of his individual mind, just as much as the Fifth Symphony (said to have been suggested by another trivial incident, the knocking at a door) was a product of Beethoven's.[250]

We have seen examples of the two classical forms of theory in the inductive procedure proposed by B. F. Skinner and the deductive procedure that was followed by Clark Hull. Certainly, there is nothing in either of these theories to suggest either that creative imagination exists or that it transcends the process of purely logical reasoning.

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[250] Norman Campbell, What is Science? (London: Methuen and Co., 1921), pp. 97, 102, quoted in Ibid., p. 144.

A third important aspect of the relation between observation and interpretation is the problem of evaluation and proof. The problems in this area are difficult because the explicit relation between theories and experience is often not very direct. There are several reasons for this condition that are of vital importance in the present context. Starting with the basis in experience first we have the problem of what Margenau has called "rules of correspondence."

> Experience, in becoming complete and integrated, moves from the sensory and spontaneous to the rational and reflective. By this transition, the elements of the given take on orderly traits and allow reason to take hold of them. Among the peculiarities of bare sense data is a certain logical haze, a tangled connectedness, which defies classification of mere data as individuals. . . .
>
> The passage to orderly knowledge involves the positing of constructs, which are the rational elements to which datal experience is made to correspond. . . .
>
> Experience moves from data to constructs via guiding relations which are called "rules of correspondence."[251]

The important thing about these so-called "rules" is not whether we can actually define them at this point but rather, the fact that the scientific theories are connected to sense experience by a network of interconnected constructs (concepts, laws, guiding relations). This inter-

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[251] Henry Margenau, The Nature of Physical Reality (New York: McGraw Hill, 1950), pp. 72-73.

connection exists in such a fashion that it is not possible to give one simple proof of a theory nor is it possible to assert that the one theory is the only possible explanation of the data at hand; for there are often great competitions between rival theoretical camps.

Of the things which seem true about the character of theories and their relations to experience is the fact that as the theory becomes more general, the obvious connection with the "logical haze" of bare experience becomes more remote. One finds that a whole network of ideas is implicated by the various subordinate components that comprise the one comprehensive system. Margenau also speaks of "circuits of verification" in this context because it is often the case that a set of observations must be connected to each other via a matrix of interlocking concepts, whose logical pathways are only remotely connected with experiental data. Thus, the inferences which can be drawn from the observations often lose immediate or obvious applicability to experience or new observations. Given this sort of complex environment, care must be taken to account for: a) the relationship of the theory to the data it represents, b) the internal consistency of the whole body internal connections between the concepts of the internal structure of the theory and c) the comprehensiveness of the theory so that it will not only account for immediate data but will also suggest new applications and hypotheses.[252]

5.1.2 THE PERSONAL AND COMMUNAL NATURE OF SCIENCE

These various complexities of the scientific enterprise all suggest that the "royal road" to scientific certitude, the closing of the gap between the poles of common-sense and general principles, is not the secure and infallible type of knowledge that it was often thought to be. Today, we find many modern scientists, some of whom we have quoted, that are of the opinion that science is a highly personal affair. The classical work in this area is Michael Polanyi's Personal Knowledge[253] in which he completely dispels the notion that a scientist is something of a truth-finding machine. In the place of such views in which a predominantly external perspective is taken, Polanyi argues convincingly for "passionate" interest that motivates a scientist in his search for new facts and their proper interpretation which he himself must ultimately accept as true. Of this sort of enterprise in which the scientist is a player in a game in which he also helps to make the rules and applies them as he sees fit, Polanyi asserts:

> This process is not specifiable in terms of strict rules, for it involves a modification of the existing interpretative framework.

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[252] Barbour, op. cit., pp. 144-146.

[253] Polanyi, Personal Knowledge, see especially Part I, pp. 3-68.

> it crosses a heuristic gap and causes thereby a self-modification of the intelligence achieving discovery. In the absence of any formal procedure on which to rely, he is guided by his intimations of a hidden knowledge. . . . Where great originality is at work in science or, even more clearly, in artistic creation, the innovating mind sets itself new standards more satisfying to itself, and modifies itself by the process of innovation so as to become more satisfying to itself in light of these self-set standards.[254]

When the innovative acts of the mind of man are viewed from the outside, in an external or explanatory framework, the passionate insistence of the innovator as the underlying factor whereby the individual improves his own mind, becomes lost in the determinism of the standards of interpretation which are imposed. Yet the scientist is no more devoid of passions and commitments than is anyother human being. Neither, for that matter, is a student on whom we would impose the structure of our program. However, the fact that in each and every case, we confront the inquiring mind of a seeker of truth and understanding does not force the conclusion that knowledge is a subjective affair that is devoid of objectivity. On the contrary, this position is intended to assert, in Bronowski's phrase, "That the event and the observer are not separable," it is the recognition that it is the whole person in meaningful contact with his environment that forms the ground rhythm of man's individual and

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[254] Ibid., pp. 395-396.

collective intellectual advance.

An important aspect of this interrelation of the knowing mind and its environment is the community of peers in which the scientist operates. In this light, the highly singular aspects of the individual quest for understanding are also seen to be shared in many important ways by the scientists' community of fellows. Science is, after all, a corporate enterprise which thrives by the gradual growth of historically based ideas which is carried on by individual scientists under the impetus of the mutual criticism, discussion and stimulus. Speaking of this community nature which has the usual attributes of human communities, Harold Schilling writes:

> It is a group of likeminded people with similar interests, predilections, goals, modes of thought, intellectual equipment, training and experience. A group of likeminded people become a community as it develops a common way of life and work, a language of its own as well as other means of communication, group ideals, ethical and moral codes, sanctions, institutions and organizations, patterns of responsibility and authority, a collective style of thought, customs, orthodoxies, and so on. As all others, this community is afflicted by the usual vagaries, adequacies and shortcomings of human beings. It has its politics, its pulling and hauling, its pressure groups; its differing schools of thought, its divisions and schisms; its personal loyalties and animosities, jealousies and hatreds, and rallying cries; its fads and fashions.[255]

[255] Harold K. Schilling, Science and Religion (New York: C. Scribner's Sons, 1962), pp. 54-55.

In this rather vivid portrayal of the communal function of science we can find something of the same theme which has been extensively developed by Thomas Kuhn in his Structure of Scientific Revolutions. Kuhn maintains that there are major changes in the assumptions of science which occur from time to time and which are responsible for what he calls a "paradigm shift" in the basic assumptions that determine how scientists see the "facts" which are before them. One of the examples he uses is the development of Copernican astronomy which we treated in Chapter One. Another would be the rise of the concept of energy as opposed to the concept of mass, a change whose importance to the history of psychology we documented in the mid nineteenth century. We cannot enter into Kuhn's work in detail but there is one aspect of it which is of prime importance to the present context.

5.1.3 THE LOGIC OF DISCOVERY AND THE PSYCHOLOGY OF RESEARCH

In developing this theme we can also open the way to concluding this brief excursion into the inner workings of science. The contrast to be developed here epitomizes the difference between the internal and external views of the processes of science and highlights the general problem of ignoring the critical function of creative, personal judgement. The external view is provided by Karl Popper in a work entitled The Logic of Scientific Discovery and the internal prospective is provided by Kuhn's Structure of Scientific Revolutions. The crux of this argument has been detailed in an article written by Kuhn in response to critics of a "Popperian" mind.[256] In this article Kuhn points out that Popper sees the progress of science as a logic of discovery in which the scientist attempts to solve the problems in which his theories have involved him. To Popper, the resolution of these problems provides a test of the theory in question, which, of course, is why Popper places such great stress upon the idea of "falsifability" as an important criterion of theories. This follows from the fact that theories can never be proven to be true but can only be proven wrong, that is, falsified. This sort of account, which is widely believed to be accurate, ignores, according to Kuhn, a vital factor in the conduct of research. Kuhn's argument is that we need to focus upon the psychological processes of research, that is, its personal or internal aspect rather than its extrapersonal or external aspect as indicated in the phrase "logic of discovery." Kuhn uses the term "puzzle" as opposed to Popper's "problem" precisely because in his ordinary work the scientist uses current scientific theory as a premise on which to build

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[256] Thomas S. Kuhn, Logic of Discovery or Psychology of Research? in Criticism and the Growth of Knowledge, I. Lakatos and A. Musgrave, eds. (Cambridge: Cambridge University Press, 1970), pp. 1-23.

the rules of his game but his real object is to solve the puzzle which confronts him as a challenge to his ingenuity. The difference between the two schemes may seem small until it is pointed out that vastly different conclusions are drawn from them.

To Popper, solving problems means testing the theory whereas, to Kuhn, solving puzzles or attempting to solve them is a test of the scientist. On this latter view, it is a puzzle which is a challenge to the integrity of the scientist such that if the test he devises is a failure it is only his scientific integrity which is impugned and not the corpus of current theory. This distinction between the two approaches is central because it points up two key aspects of the character of science that are of importance in this context. In the first place is the fact that major changes can and do occur in the basic assumptions of science. It is in this sense that Kuhn agrees with Popper, that is, there are times when the theory is tested and times in which it is in fact falsified. The result of this falsification is a new paradigm for the science in question and it represents a major change in the whole orientation of the scientific community, this holds for small highly specialized communities or for the general scientific community in the case of major changes. But, by definition, these changes are extraordinary occurrences so that in the second place we see that far and away the most frequent modus operandi of the individual scientist is in the normal puzzle solving mode. In this mode he pits his own brilliance against that of others in an effort which the current theory serves to define and also to guarantee that given a sufficiently sanguine approach the problem can be solved.

Kuhn's characterization of the mode of "normal" science is obviously in harmony with positions taken by the others whose thought we have presented in an effort to focus upon the "subjective" aspects of the processes of science. The increasing realization of the nature of the individual commitment which is involved in the conduct of scientific inquiry also helps to explain the corporate nature of the scientific enterprise and the development of the intense "loyalties, animosities, fads and fashions" which are to be observed in science in general and which have obviously operated in the history of psychological theory. It is important to note, and this is one of the main points we wish to draw from the above discussion, that this same role of the individual, the nature of his intellectual processes, the character of his interaction with man's intellectual history and with his fellow man, has been completely invisible within the vast majority of the theories of psychology which we have covered to this point. We count it as an extreme irony that psychology, the study of man, has produced so little in the way of understanding the man whose efforts at the production of physical science it has been trying to reproduce in psychological science. In this, the irony seems compounded for not only have the devotees of the physical sciences led the way toward establishing the original paradigm which the psychological sciences have adopted but they have also administered the final insult of demonstrating, by their own growth, that the model which psychological theory is pursuing is no longer valid. Kuhn observes that the "transfer of allegiance from one paradigm to another is a conversion experience that cannot be forced." In this, he urges, an individual's resistance is "not a violation of scientific standards but an index to the nature of science itself." However, it is also true that prolonged resistance to the changes taken by the scientific community eventually become illogical and unscientific. Therefore, Kuhn feels that the historian is justified in concluding that:

> the man who continues to resist after his whole profession has been converted has ipso facto ceased to be a scientist.[257]

We would simply extend this statement to apply to psychology as a science with the realization that should it persist in its refusal to relinquish the narrowness of those theories

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[257] Kuhn, Structure of Scientific Revolutions, p. 151.

which are the direct result of the mechanistic world-view, then, it may well find that ipso facto it has ceased to be a science. These are strong words yet, what psychologist is not more than a little embarrassed by the insights into human nature which are provided by the Fechner's, Whitehead's, Einstein's, Polanyi's, Barbour's, Bronowski's, Margenau's, Schilling's and Kuhn's, who are, to the man, physical scientists and not psychologists? That each of them has made substantial contributions to areas other than their original field--contributions which, by and large, point up the central role played by persons who belong to a community, who have faith in its methods and who work to understand the world by accumulating a corpus of reliable theory which is systematically related to direct observations--is to be taken as an indication that there is an important similarity in the basis of all scientific theory and its disclosure of reality. This leads us to the last topic we will treat in this brief characterization of the nature of science namely, What is the relation of a scientific theory to reality? That is, What kind of truth is disclosed by science?

5.1.4 MODERN ALTERNATIVES TO NAIVE REALISM

Since such questions are obviously philosophical problems, we must turn to the various philosophical interpretations that have been offered to account for the relation between theory and reality. We have seen that a dominant characteristic of early scientific thought was a naive realism in which the scientist held a strong commitment to the ideal that a scientific description was a direct, literal description of the true character of reality. Newton believed that it was "the business of true philosophy to derive the natures of things from causes truly existent, and to inquire after those laws on which the Great Creator actually chose to found the most beautiful Frame of the World." We label this view naive realism and are sometimes unkind in our treatment of it; however, it is also obvious that each past scientist, in his turn, has confronted the task of science with the same wholeness of mind, spirit and commitment that we have come to believe is operative in modern scientists. What has happened is that there has been a paradigm shift in which, since the early part of this century, the fundamental basis of this type of realism has been destroyed. Since that time, scientists have come to realize that theories are not literal representations of "the most beautiful Frame of the World." Four basic philosophical interpretations which are alternatives to the old realist view and which are current in modern thought are: 1) theories viewed as summaries of data--positivism, 2) theories viewed as useful tools--instrumentalism, 3) theories viewed as representations of the world--realism and 4) theories viewed as mental structures--idealism.[258]

By mentioning each of these briefly we can provide a useful introduction to the type of realism which is appropriate to the organismic approach we have introduced in earlier sections and which will occupy an increasing portion of the remainder of this presentation. Taking the various positions in turn we first come to positivism.

Positivism is something of the extension into modern times of the empiricism of Bacon and Hume. Percy Bridgman whose work Logic of Modern Physics and approach to operationism we have mentioned earlier was an important modern exponent of this view. For the positivist, theories are summaries of the data which simply categorize the data efficiently and conveniently. On this view the proper starting place for the theory is simply the bare sense data which are the basic observations of fact. Our position which has been repeatedly asserted is that there is no such thing as an "uninterpreted fact." This interpretation was introduced in connection with Whitehead's denial that:

> the primary activity in the act of experience is the bare subjective entertainment of the datum, devoid of any subjective form of reception. This is the doctrine of mere sensation [sensationalist principle].[259]

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[258] Barbour, Issues in Science and Religion, pp. 162-171.

[259] Whitehead, Process and Reality, p. 183.

Whitehead also credits Kant with the recognition that Hume's problem required the imposition of some form of subjective impression upon the data. Additionally the accounts of Einstein, Polanyi, Kuhn, etc., all point to the fact that there are simply no uninterpreted facts. Interpretations are the products of a selective and abstractive theoretical framework. The failure of the empiricist and positivist approaches to recognize the critical role of theories in the conduct of research is also a clear indication that they would totally fail to appreciate the role of the theorist--a criticism we have more than once placed upon B. F. Skinner's psychology.

The idea of theories as useful tools or Instrumentalism gives more credit to the role of the theorist than positivism. Here theories are seen to be the rules of the game by which a scientist accomplishes the task of investigation. The problem is that theories then become disconnected from the character of reality and do not need to have any definite observable correspondence with real entities. Clearly, theories which float in this manner are at a definite disadvantage when it comes to comparing alternative theories about the same topic. How is it possible to adduce evidence for or against either theory? Put simply, it is not. It is also to be noted that a good portion of psychological theory can be categorized in this way. Recall the shift we observed in the gestalt field interpretation in which its original physical and physiological basis was given over to the methodological form of "field" used by Kurt Lewin. Freud's theory may be taken as another case in point though the similarity is not as obvious without the type of analysis given earlier. Instrumentalism can and does give rise to a lot of critical discourse between individuals and between individual schools of thought. Kuhn[260] however, points out that theories of this type are not at all unlike the theories of astrology before the advent of modern astronomy. On this view, astrological theories are seen to provide reasons for and explanations of the various phenomena in the heavens but they fail to provide the all-important "puzzles" that a scientist can struggle with. This is the case because everyone expected the astrological theories to be of low accuracy and had many cogent reasons for these inaccuracies; reasons which were the subject of much critical discourse. For the mind-bending scientific puzzles to develop it was required that the practitioners of the science should share an explicit method and criteria which related the theory to the reality of the observed occurrences. In this way, it was possible for failures to lead to puzzles which could prompt the generation of new

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[260] Kuhn, Structure of Scientific Revolutions, pp. 52-97.

calculation, observations and instruments. Unless the ingenuity of the individual scientist can be challenged within the corpus of a theory which makes some meaningful statement about actual things, the level of discourse will remain critical but also astrological in character. Only puzzle solving is capable of preparing the way for its own replacement, hence scientific development, since critical discourse can easily explain away the basis for further inquiry unless it is checked by recourse to experimental data.

The third major alternative is Idealism. In this, we find the ultimate step in the recognition of the contribution of the knower. That is, the structures of reality are all seen as being imposed by the mind of the observer. This is also an important factor in the Whiteheadian framework since the direct effect of this approach is to establish the fact that conscious experience is the foundation of all experience. While we easily accept this position, Whitehead explicitly denies it. Recall that for Whitehead, conscious experience is the culmination of experience and not the beginning of it. This is a typical example of the Whiteheadian "inversion." Kant is credited with the innovation in philosophy which recognizes the subjective contribution of the individual, but Whitehead was quoted as saying "For Kant, the world emerges from the subject; for the philosophy of organism, the subject emerges from the world."

Idealism then, requires that:

> the datum in the act of experience can be adequately analysed purely in terms of universals.[261]

This statement refers to what Whitehead calls the "subjectivist principle" which is the companion of the "sensationalist principle" mentioned under positivism. Obviously both of these principles relate to what we consider the process of perception to be all about and are therefore, intimately connected with issues in psychology, ancient and modern. Clearly, they are also importantly related to the philosophical history which was covered earlier. Whitehead uses both of them in his analysis of the various philosophies because they are important ways "to scrutinize . . . the character to be assigned to the datum in the act of experience. The whole philosophical system depends upon [this all important act of scrutinizing the way these principles are applied]."

Not all idealists have been philosophers of old however. Among moderns there has been Arthur Eddington,

> The fundamental laws and constants of physics are wholly subjective . . . for we could not

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[261]Whitehead, Process and Reality, p. 183.

> have this kind of a priori knowledge of laws governing an objective universe.[262]

and also Henry Margenau who we quoted earlier on theory development ends up by concluding:

> Science defines a dynamic kind of reality, one that grows and changes as our understanding grows and changes. . . . I am perfectly willing to admit that reality does change as discovery proceeds.[263]

From this it is safe to conclude that idealism is not going to provide any necessary reasons as to why some theories give accurate predictions about empirical relations and others do not. Unless some reasonable method can be obtained for establishing such a correspondence between events in the world and the structures of our theories there seems little hope of progress. Fortunately, there is an alternative to be found in the last category of philosophical theory to be considered.

Realism, the doctrine that we criticized earlier, also has a modern counterpart which asserts that what we know of nature does in fact have some objective relationships in nature. In this view, theories are not simple positivistic summaries of facts, neither do they float in an idealistic void. They are also more than simple tools for the

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[262] Arthur Eddington, The Philosophy of Physical Science (Cambridge: Cambridge University Press, 1949), p. 105, quoted in Barbour, op. cit., p. 167.

[263] Margenau, The Nature of Physical Reality, p. 288, quoted in Barbour, Ibid., p. 168.

instrumentality of conscious understanding. A realist is one who accepts the fact that being is prior to knowing and that it is only by accurate reference to the world that we can develop any understanding of it.

From the introduction to the philosophy of organism in Section 3.3, we can see that Whitehead's organismic metaphysics require a realist epistemology as a result of the "ontological principle." The importance of this premise is stated in many forceful ways by Whitehead, having already used one version, we can substitute another at this point:

> The actual world is built up of actual occasions; and by the ontological principle whatever things there are in any sense of "existence" are derived by abstraction from actual occasions. Apart from the experience of subjects there is nothing, nothing, nothing, bare nothingness. The most general term "thing"--or, equivalently, "entity"--means nothing else than to be one of the "many" which find their niches in each instance of concrescence.[264]

Whitehead's comments on the sensationalist principle as it applies to positivism, Hume being a prime example, and also on the subjectivist principle of Kant's philosophy, make it clear that his realism entails that the world be viewed as to its wholeness rather than an assemblage of isolated and

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[264] Whitehead, Process and Reality, quoted in A Key to Whitehead's Process and Reality, Donald W. Sherburne, ed. (Bloomington: Indiana University Press, 1966), p. 18.

Sherburne's treatment of Whitehead involves assembling segments of text found throughout Process and Reality into one complete segment. Thus, the above quotation is Sherburne's cogent patchwork of several Whiteheadian sentences.

disconnected sense-experiences or a fabrication of the inquiring mind. The reason for Whitehead's formulation of the idea of "actual entity" or "actual occasion" was to underline this very point. Actual entities exist in a unity of interrelatedness which is determined as a result of both their external relatedness and also their internal or process aspects. The point to be made here, is simply that the events which constitute reality, exist in interrelated networks, do in fact have an inner (process) and an outer (reality) and that in the process of knowing these events we must abstract from the character of these entities by using a selective and symbolic system of representation.

One of the first implications of this view for theories in the human sciences, is that our experience of the world is actually a unity of experience in which it is only by dint of high abstraction that we create the isolated mental states of awareness which so much of past philosophy and psychology has assumed to be the basic elements of knowledge. This is the Whiteheadian "inversion" argument again and shorthand summary of the more detailed "Fallacy of Misplaced Concreteness" which was discussed in Section 1.3. Since that discussion also included the scientific thought of the seventeenth century, we are left with two important realizations. First, since much of the fabric of our present psychological theory is a direct outgrowth of the basic approach inherent in seventeenth century thought, we are, in reality only working with a small sampling of the true interrelations which are important to the actual entities of the world. Said differently, scientific concepts represent selective aspects of the richness of meaning that constitutes the true "concreteness" of reality. The second point is that by building our understanding of ourselves out of such narrow aspects of reality, by placing our trust in the "misplaced concreteness" of what appeared to be separate substances, we have ignored the unity of process that is also a part of our own nature. We may therefore assert that there are many rich and important aspects of the human self which have been overlooked in our fascination with the highly elaborated and brightly shinning "baubles" of sophisticated intellectual knowledge. In relation to these high abstractions, the missing knowledge is really rather "primitive" in the sense that it comes first and is vague in comparison to the shrill clarity of intellectual knowledge. Yet, is not this "primitive" sort of knowledge just what we have been looking for in the tradition of psychology as a human science and in the urging of the various romantic reactions to abstract science? Our conviction is that Whitehead's form of philosophical realism is in fact just the missing link for which we have been searching. It is the method by which the apparently dual aspects of man's mind and man's body, his free and determined natures, the depths of his emotional being and the heights of his intellectual knowledge, can be reunited into an actual entity whose unity is known both in terms of its objective and subjective realities. This amounts to the development of a new awareness of man's self-consciousness in which we become aware of ourselves in rapport with and participating in the processes of nature which extend beyond ourselves.

5.1.5 THE UNIFYING CHARACTER OF CRITICAL REALISM

In pulling together the various comments about the nature of science and its theories, we can start by agreeing with Barbour that the scientific enterprise is a many-faceted phenomenon.

> Its genius has been precisely the interaction of components which oversimplified accounts have portrayed in isolation. It involves both experience and theory, neither of which taken alone constitutes science. It requires both logical processes and a creative imagination transcending logic. Its theories are evaluated at once by empirical agreement, rational coherence, and comprehensiveness. Individual activity and originality are significant but occur within the tradition of a scientific community and under the influence of its paradigms. Scientific language does refer to the world, but only symbolically and partially, sometimes using analogies or models of limited scope.[265]

In addition to this, we can observe that the critical

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[265] Barbour, <u>op. cit.</u>, pp. 173-174.

realism of Whiteheadian philosophy provides a useful correction to the various "oversimplified accounts" of the nature of science which characterize earlier philosophy of science. The divisive abstractions of the positivists, idealists, instrumentalists and naive realists can now be balanced into a new harmony. This new harmony is formed by the intersection of the separate dimensions of thought which have been created by the two sets of polar opposites. On the one hand, positivism has asserted the meaningfulness of empirical data to the exclusion of its opposite, idealism, which has asserted the meaningfulness of intellectual coherence. While on the other hand the instrumentalists have attempted to use the tools of their trade to unlock the reality with which the naive realist finds himself theoretically at one. Critical realism is the fulcrum upon which each of these separate dimensions can be balanced. It agrees with the positivist on the importance of empirical statements and with the idealist in his search for intellectual coherence. With the instrumentalist, critical realism holds that theories are the only guide to useful scientific investigation while at the same time it can agree with the old naive realist position that many important aspects of being do, in fact, exist prior to knowing.

The modifications which critical realism provides to each of these views are all related to a more accurate appreciation of the complete character of the role played by creative human intelligence in the realization of scientific knowledge. As man's true role in the production of the scientific understanding of nature becomes clarified, we can and should expect corresponding increases in man's scientific understanding of himself.

5.2 SPECULATIVE PHILOSOPHY: A METAPHYSICAL INTROSPECTION

The inclusion of the word "introspection" in the title of this section, is meant to perform a very important function with respect to the relation of the philosophy of organism and its possible uses in the formulation of psychological theory. On this matter, a slight digression seems to be in order.

Introspection as a method is obviously very old within the field of psychology; a method that has had many and varied uses. These uses have been so varied in fact that the role of introspection in theory formulation has come to mean simply a description of however it is that one finds whatever it is that one finds when he considers his subjective reality. What we would hope to add to this history of the introspective method, is an interpretation of the same process which is based upon the alternative metaphysics of the theory of organic mechanism.

Of the various introspective methods which have been discussed, the most limiting as to its scope was probably that which was developed by Wilhelm Wundt. The basic limitation of this approach was the fact that it was explicitly tied to materialistic metaphysics by virtue of the atomistic epistemology that Wundt was constrained to use. We assert that Wundt was constrained to use this view because if he had not, he may well have ended up as Dilthey did. Dilthey developed a more fulfilling introspective description but only at the expense of severing any explicit contact with the reigning epistomology and metaphysics. He therefore, ipso facto, became in the eyes of his contemporaries a philosopher rather than a scientific psychologist.

The main character of this discussion will be to establish a basis for introspective analysis which combines the much needed epistemological emphasis of Wundt with the necessary subjective validity which is found in Dilthey. This task can be achieved by enveloping them in the larger, more inclusive framework of organismic metaphysics. We have argued that the main limitation inherent in traditional science, philosophy and psychology has been its emphasis upon the mechanistic metaphysics of the modern era. As a first approximation of creating a replacement for this older view, the first level relation between organismic metaphysics and conscious experience will be described.

We have asserted in many ways that it is a truer apprehension of the character of man's being in the world that will be the basis of a more satisfactory intellectual understanding of man's psychological nature. In seeking this expanded perspective, we are mindful of the fact that any discussion of this sort must be humble, and in many ways, a worshipfully meditative enterprise; yet, to seek the transcendence of perceived limitations also calls for a certain speculative boldness and willingness to modify tradition.

If we use our own internal awareness as a model, it is clear that the external scientific descriptions of our own bodies, even to the extent of allowing a neurophysiologist to record electrical potentials deep in our brains, would not be the same as the self-consciousness we experience directly as "I." In this vein, we can characterize the long asserted desire of the human scientific psychologists, the phenomenologists and finally the existentialists as an effort to realize the "within" of nature that has been excluded by excessive concentration on the "without." There is, in fact, no room for the scientific appreciation of consciousness, willing, feeling and valuing except by virtue of a change in the emphasis of the formulations upon which the scientific enterprise rests.

The limitations of the old system, because of its concentration on the without of things, have been most acute in dealing with the human self because this self is the most elaborate and evolved self in nature yet, it is now beginning to appear that the same limitation also applies in ever lesser degrees to ever lesser levels of being. We are, therefore, in the position of asserting that it is no accident that the scientific approach which focuses primarily upon the external aspects of nature has been most successful in describing those levels of nature in which the external aspects dominate. Thus, the highly developed state of physics and chemistry is in part attributable to the fact that the character of the phenomena with which they deal is primarily determined by the external aspects of their natures since the internal aspects of determination are negligible. Of this condition Whitehead quips to the effect that if we desire an uninterpreted record of experience we must ask a stone to record its autobiography.[266]

Scientific knowledge represents an approach to reality which is a selective and abstract process that is described in various symbolic languages. The outcome of this process yields the familiar laws, hypotheses and mathematical descriptions of the external aspects of the phenomena we observe. An important characteristic of science is that it has developed a tremendous instrumentation and technology which has helped to elaborate and refine the precision and

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[266] Whitehead, Process and Reality, p. 18.

depth of empirical statement that science can make. However, it is evident that the primary effect of this elaboration is simply to extend the type of conceptual framework in which the technology resides. For all of its sophistication and value, this type of approach really only yields data which is applicable to the framework of abstractions from which it originally started. We may assume therefore, that the various approaches which are evident in the specialized sciences provide a picture of reality which is in varying ways an assemblage of partial abstractions expressed in symbolic terms, and which do not necessarily provide an exhaustive description of reality as a whole. It is also true that the various methods of science produce specialized information about vastly different levels of reality. For this reason, the external explanatory character of traditional physical science has been most successful with measuring and quantifying those aspects of nature in which external determination predominates. On this view, the often mentioned "primitive" state of psychological theory is not simply attributable to the newness of scientific psychology as a discipline but is, rather, a direct result of the basic characteristic of science itself. There is an inherent loss of explanatory power and exactness of measurement as the level of investigation shifts away from physics and chemistry to biological and finally to psychological investigation. This variability in the efficacy of scientific explanation is a direct result of the fact that as the transition to higher levels of phenomena is made, the requirement to become more sensitive to the role of the internal rather than the external factors is increased. The importance of subjective factors reaches its zenith in the study of man and therefore levies the requirement that a major segment of scientific data must be drawn from man's analysis of his own awareness of what it means to be. It is with this realization that we can turn to the broader aspects of the formulation of the philosophy of organism and inquire into the role which is ascribed to the highest level of subjectivity in nature--the being of man.

5.2.1 EXPERIENCE AND SPECULATIVE PHILOSOPHY

In stepping outside the traditional framework of scientific approach to psychology it is important to define just how far we are required to travel with such a step. We can put all ambiguity about the matter aside with the following thought that Whitehead included in the Preface to his major work, Process and Reality.

> . . . the movement of historical and philosophical criticism of detached questions, which on the whole has dominated the last two centuries, has done its work, and requires to be supplemented by a more sustained effort of constructive thought.[267]

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[267] Ibid., p. ix.

We are dealing then, with two hundred years worth of detached questions and have the problem of attaching them into some unified framework. This replacement process is also detailed by Whitehead as being:

> . . . the true method of philosophical construction [which] is to frame a scheme of ideas, the best one can, and unflinchingly to explore the interpretation of experience in terms of that scheme.[268]

We see the philosophy of organism as a scheme of ideas which is highly applicable to the "interpretation of experience" and have therefore, chosen to draw the parallel between it, the problem of introspection and the interpretation of psychology as a human science. That the problems of scientific psychology are a matter for "philosophical construction" is, we feel, amply demonstrated by the material which has been presented in the first section of this chapter. On this same point, Whitehead asserts that:

> . . . all constructive thought, on the various special topics of scientific interest, is dominated by [a basic metaphysical] . . . scheme, [which is] unacknowledged, but no less influential in guiding the imagination.[269]

Philosophy to Whitehead is the consistent and "unflinching" effort to make such schemes explicit so that they can be criticized and improved. We have had an ample taste of the criticism which devolves upon the materialist scheme when

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[268] Ibid., p. ix.

[269] Ibid., p. ix.

one assumes the organismic point-of-view, and the time has now come to consider those aspects which form the basic scheme of the philosophy of organism and which purport to contain a useful interpretation of experience.

In entering this topic, we should also include the final remark which Whitehead felt was an appropriate conclusion to his opening remarks in the Preface.

> There remains the final reflection, how shallow, puny and imperfect are efforts to sound the depths in the nature of things. In philosophical discussion, the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly.[270]

To unflinchingly explore an interpretation of experience which is formed as best one can but which is, nevertheless, shallow, puny and also poised upon the brink of manifest folly is a big order indeed. Whitehead explores these issues in the first chapter of Process and Reality in what has become famous as his "Defense of Speculative Philosophy."[271] The importance of this argument to metaphysics in general is underscored by the fact that Whitehead saw fit to begin his presentation with it and also by the fact that it is the most widely quoted part of the volume.

Speculative philosophy in Whitehead's eyes is the

> endeavor to frame a coherent, logical, necessary system of general ideas in terms of which

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[270] Ibid., p. ix.

[271] Sherburne, A Key to Whitehead's Metaphysics, p. 191.

> every element of experience can be interpreted. . . . [Interpretation means that] everything of which we are conscious, as enjoyed, perceived, willed, or thought, shall have the character of a particular instance of the general scheme. Thus the philosophical scheme should be coherent, logical, and, in respect to its interpretation, applicable and adequate.[272]

The four key words of that last sentence, coherent, logical, applicable and adequate, are the hallmarks of Whitehead's creation and are also the reason why the philosophy of organism sounds so foreign to someone on first contact with it. Focusing briefly on each notion will serve as an important basis for appreciating the more detailed metaphysics. It is important to bear in mind that this discussion considers those topics which are appropriate to the development of an adequate scheme of ideas and does not refer directly to the ideas themselves. Nevertheless, this is the basis that forms the interpretative elements of the final system. That we find such an explicit statement of philosophical first principles strange is simply another way of recognizing the implicit character of the traditional system of root ideas.

Coherence in the system of fundamental ideas means that each basic term in the system must presuppose the other terms. Since Whitehead holds that no entity can be conceived in complete abstraction from the rest of the

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[272]Whitehead, <u>op</u>. <u>cit</u>., p. 5.

universe, the character of coherence demands that the fundamental ideas should be taken as mutually defining each other in ways which are impossible if the unity of the system is destroyed in attempts to isolate one or more terms into an abstractive context. By way of forming a stark contrast, we can note that Einstein saw the goal of science as reducing "all concepts and correlations to as few as possible logically independent basic concepts and axioms." We must bear in mind that the contrast here is the difference between the goals of an explanatory physical science, which can and does, seek to formulate "logically independent basic concepts and axioms" and the philosophical goals of a complete descriptive system that would exclude nothing from its preview before it starts the process of systematization. In other contexts, Whitehead uses the term "assemblage" to convey the meaning of the large-scale notions which form the basis of the more particularized systematic accounts of experience which are found in specialized contexts.

The term logical refers to the usual sense of logical consistency and freedom from self-contradiction. Whitehead is, however, at pains to point out that the "scheme of logical notions" must also be contained within the more general philosophical system. Whitehead proposed this condition in 1929 before two famous discoveries within the field of logic made essentially the same point in 1931. We are not really interested in arguing Whitehead's apparent philosophical priority but wish to underline the character of these discoveries and their major implications. One of the best nontechnical discussion of the discoveries of Kurt Godel has been provided by Jacob Bronowski.[273] Godel's work is striking because he established the formal proof that any logical system of more than trivial complexity can neither prove itself to be complete nor can it guarantee that all possible deductions from its axioms will be consistent with those axioms. Still another and deeper limitation was subsequently demonstrated by Alfred Tarski with his proof that every attempt to establish a system of formal language will contain assertions which cannot be demonstrated to be either true or false. Bronowski, in a vein reminiscent of our earlier discussion, attributes these critical limitations in logical systems to their lack of "self-reference." That is, he views the limitations of the logical systems as being related to those very aspects of the creative and imaginative mind of the scientist that are ignored in systems which are designed to explain the external natures of things.

In returning to direct consideration of Whitehead's thought, we find that the twin requirements of coherence

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[273]Bronowski, <u>On the Limits of Scientific Knowledge</u> in <u>Man and The Science of Man</u>, Coulson and Rogers, eds., pp. 31-49.

and logical necessity are obviously mutually implicative and cannot be arbitrarily disconnected without sacrificing some of the generality of the system that is an absolute necessity at this level of argument.

The last two special topics of applicability and adequacy can be taken together and labeled the "empirical side" of speculative philosophy as opposed to the requirements of coherence and logic which are the "rational side" of the system. It hardly seems necessary to point up the similarity of this division with that of within as contrasted to without and internal as contrasted with external which has figured prominently in previous discussion. In this context applicable means that some items of experience are in fact interpretable by the system and the idea of adequate is intended to assert that all items of experience can be so interpreted. To emphasize the generality of this demand, we need only recall that it includes "everything of which we are conscious, as enjoyed, perceived, willed or thought." In short, all aspects of immediate experience must be capable of interpretation as a particular instance of the general scheme.

Now that the programmatic character of speculative philosophy is apparent, we can begin to focus more closely upon the role of metaphysical interpretation in science and psychology.

5.2.2 PSYCHOLOGICAL METAPHYSICS

Metaphysics must be thought of as the search for generalities which unify diverse areas of experience into a whole such that the particular parts find additional meaning by virtue of such inclusion. This fact is often ignored or played down by the tremendous bias that is produced as a result of interpretations of intellectual behavior which ignore the role of the individual creative intellect in the formation of new knowledge. Since the more complete aspects of the actual role of the creative intellect have figured so prominently in the previous discussion, we need not dwell on their justification here. Instead, we can focus on Whitehead's use of the idea in the context of metaphysical construction.

The idea behind strict empiricism as interpreted by the Baconian method of induction implies that facts are sufficient into themselves and do not need to be explained by any constructive efforts on the part of the scientist. Whitehead, of course, categorically denies this. He expressed his feeling on the matter in a very apt and often quoted metaphor as follows:

> What Bacon omitted was the play of free imagination, controlled by the requirements of coherence and logic. The true method of discovery is like the flight of an aeroplane. It starts from the ground of particular observation; it makes a flight in the thin air of imaginative generalization; and it again

> lands for renewed observation rendered acute by rational interpretation.[274]

Without an appreciation of the imaginative construction which is the basis of the "wholes" by which specific "facts" become meaningful there can be little to be gained through consideration of metaphysical problems.

The basic presupposition upon which the entire quest for metaphysical insight rests is that the part, or individual element of experience, is given meaning by and cannot be separated from the whole in which it occurs. To speak of isolated parts is a restriction of generality to the precise extent that the part becomes an isolated fragment. Conversely, it is impossible to interpret any experience except from the perspective of an assumed whole which functions to structure the reality of the observation. Against the tradition of science which venerates isolated facts and objects to metaphysics Whitehead asserts:

> Unfortunately for this objection, there are no brute, self-contained matters of fact, capable of being understood apart from interpretation as an element in a system. Whenever we attempt to express the matter of immediate experience, we find that its understanding leads beyond itself, to its contemporaries, to its parts, to its future, and to the universals in terms of which its definiteness is exhibited. But such universals, by their very character of universality, embody the potentiality of other facts with variant types of definiteness. Thus the understanding

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[274] Whitehead, Process and Reality, p. 7.

> of immediate brute fact requires its metaphysical interpretation as an item in a world with some systematic relation to it. When thought comes upon the scene, it finds the interpretations as matters of practice. Philosophy does not initiate interpretations. Its search for a rationalistic scheme is the search for more adequate criticism, and for more adequate justification, of the interpretations which we perforce employ.[275]

Thus, not only is it true that metaphysics cannot be completely avoided, it is also clear that the paradigm case for metaphysical interpretation is our attempts "to express the matter of immediate experience." This is a basic point in the character of metaphysical formulation. Since "the elucidation of immediate experience is the sole justification for any thought; and the starting point for the thought is the analytic observation of components of this experience,"[276] and since we directly observe the fact that understanding immediate experience leads beyond it to its contemporaries, to its parts, to its future and the potentialities for other types of definiteness we are justified in the assertion that assumptions which involve the nature of reality as a whole cannot be avoided. While it is true that we can often bracket these larger contextual issues for the purpose of considering specific issues in specialized contexts, it is also clear that those enterprises are

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[275]<u>Ibid</u>., p. 18.

[276]<u>Ibid</u>., p. 7.

constrained to function within the larger picture and cannot manifest attributes and characteristics of which the whole is devoid.

From what has been said so far, it is clear that the metaphysics to which Whitehead has reference is a metaphysics which is constructed to describe this world and not some abstract ideal which is removed from the context of life as it is experienced. As in creative scientific thought, the "aeroplane must again land for renewal observation rendered acute by rational interpretation." In this case, the goal is the "elucidation of immediate experience" and the truth claim of Whiteheadian metaphysics is simply the comparison of the metaphysics by the standards of coherence, logic, applicability and adequacy with the world as we experience it. One good reason for dwelling upon this type of role for metaphysics has already been provided by Hume. In addition to the earlier commentary concerning the nature of his empiricism and philosophical skepticism, it is instructive to consider what Hume, the man, thought of the true character of his metaphysics.

> Most fortunately it happens, that since reason is incapable of dispelling these clouds [deep philosophical dread and anxiety], nature herself suffices to that purpose, and cures me of this philosophical melancholy and delirium. . . . I dine, I play a game of backgammon, I converse, and am merry with my friends; and when after three or four hours' amusement, I wou'd return to these speculations, they appear so cold, and strain'd and riduculous,

> that I cannot find in my heart to enter into them any farther.[277]

We gladly agree with Hume that nature does suffice to the purpose of dispelling the deep darkness of skepticism; how different indeed, would the history of philosophy have been if Hume had listened to the promptings of his heart and assumed with Whitehead that:

> The proper conclusion of this discussion is, first, the assertion of the old doctrine that breadth of thought reacting with intensity of sensitive experience stands out as an ultimate claim of existence; secondly, the assertion that empirically the development of self-justifying thoughts has been achieved by the complex process of generalizing from particular topics, of imaginatively schematizing the generalizations and finally renewed comparison of the imagined scheme with the direct experience to which it should apply.[278]

Metaphysics then, is really a confession of faith as to what the ultimate claim of existence is. For modern man there is no other rational recourse but to confront the fact that he is not going to find meaningful answers by exclusively relying upon either the rational side of philosophy or the empirical side of science for the development of solutions to the intractable problems which have confronted standard scientific and philosophical interpretation. Abstract science and or philosophy alone cannot

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[277] Hume, A Treatise of Human Nature, quoted in Jones, A History of Western Philosophy, p. 801.

[278] Whitehead, Process and Reality, p. 20.

provide the answer because every question they can pose must necessarily contain some reference to the metaphysical presumptions of their world-view. The same applies to methodological procedures and epistemology; even logic, language and technical philosophical methods are all seen to contain necessary assumptions about what is finally the case with reality.

Organismic metaphysics can offer an alternative to the views of the last two hundred years, which Whitehead claims have done their work, by asserting the basic truth of the type of synoptic whole which is constituted by the basic intuitions of the human mind as they are known in immediate experience. Of this type of experience, Whitehead claims that the primordial experience of man:

> . . . arises out of the past: it enriches with emotion and purpose its presentation of the contemporary world: and it bequeaths its character to the future, in the guise of an effective element forever adding to, or substracting from, the richness of the world. For good or for evil.[279]

The world is clearly prior to the advent of an individual mind and therefore must have structures which exist independently of that mind and which are the basis of its experience. This view does not however, restrict the totality of that mind to those aspects which are reflected in that

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[279]Whitehead, Symbolism: Its Meaning and Effect (New York: Capricorn Books, 1959), pp. 58-59.

encounter. On the contrary, it is the essence of organismic metaphysics that it asserts the priority of immediate experience without also imposing upper limits as to its precise potential or attempting to enforce ultimate conclusion as to what the future should contain. In this we have something of a paradox since at the same time the ultimate transcendence of the human mind is asserted, the metaphysic is also asserting that the world itself is greater, therefore transcendent, in relation to the knowledge we have of it. Surely it is one of the functions of purposive human actions to attempt the resolution of this double paradox by expanding the general consciousness of what is actually experienced. Such an expansion has been the result of the continual "demand for intellectual justification of brute experience"[280] which has characterized the being of man.

In this last characterization of immediate experience we have imbedded it in the two-way transcendence of its own ineffable relation to its existence beyond itself and also to its naively held grasp on the totality of the material world. Another way of talking about his distinction is to refer to the institutions of knowledge which have developed around these basic poles of being. In the case of the transcendent self, we have religion and in the case of the transcendent world we have science. In between, there are

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[280] Whitehead, Process and Reality, p. 19.

the various coordinating schemes of philosophy, metaphysics, epistemology, etc.. These two polarities have rather opposite functions. The institution of religion and acts of religious nature in one's life have the function of expanding individual interest in the direction away from the particularity of the world and its scientific description and treat issues which relate to the formation of the experiencing subject himself. By contrast, science deals with the relation of the experiencing subject and the outside world of objects. In both cases however, it is the focal center of the experiencing subject that seeks expansion into greater harmony with these two major categories of experience.

This sort of interpretation is plainly true of the early history of the epoch of materialistic science. By way of extreme contrast, it is also reasonable to assert that it can even be applied to the utopian thoughts of nonmentalistic and nonspiritual theoristists like J. B. Watson and B. F. Skinner. Both of these men have sought to display the hypothesized efficacy of their highly abstract, specialized concepts in the arena of generalized goals which relate to man's transcendent nature.

It is fitting to close this discussion of metaphysics with the observation that the basic descriptive principles which were of central importance in past discussions of efforts toward the creation of psychology conceived as a human science, namely, the reality of the within of experience as opposed to the without of experience, find exemplification and expansion in organismic metaphysics. In the organismic framework which centers on the validity of the internal sensitivity of the experient subject, and which sees the demand to justify experience as being created by man's natural propensity toward expanded awareness, are to be found the means to foster a deeper awareness of both the scientific and spiritual aspects of man.

Organismic metaphysics enhances appreciation of the fact that science and spirituality concern singularly different areas of individual experience. On the one hand, there is the relationship to the transcendence of self by the unknown potentialities of human nature while on the other hand, there is the transcendence of the physical world in relation to man's understanding of it. In between these two poles of transcendence, there is the sensitive reaction of the experiencing individual which is seeking to harmonize both aspects into expanded awareness. Toward what is generally considered to be the spiritual side of this relationship, it is evident that the task confronting the individual is to seek to harmonize emotion, purposes and the influx of man's transcendent nature with experiences which are derived from rational thought and interaction with the perceived world. Toward what is generally considered to be the material side of this relationship, the task confronting the individual is to bring rational thought into harmony with the physical world as experienced.

These aspects of being have traditionally been institutionalized in society in the divergent areas of science and religion. To the extent that "civilized progress" has tended to sunder their immediate relationship within the individual's awareness of life processes then, to that extent, which has been considerable, the "progress" of man has been positive but destructive of the true unity of spiritual and rational life. The message of organismic metaphysics is to seek positive but constructive progress toward enhanced being. Its chief innovation in the creation of such positive and constructive goals is the recognition of the reality of the fact that the true processes in the world of man are none other than those which are found in the experiencing subject himself.

This is the unity with which an enlightened science of psychology must deal. Psychology no longer needs to derive its methodology, epistemology, and metaphysics from those sciences which study lower levels of being in which external factors predominate. It no longer needs to believe that it can somehow collect enough pieces of man's nature to describe him usefully. While psychology will always have a place for empirical precision and direct observation, it can only meaningly engage in such activities after it has assumed the role of being the expositor of the wholeness of man, a wholeness which it has first recognized as deriving from the manifestation, within the individual experiencing subject, of the unity and harmony of spiritual and material existence. Such a psychology will not shrink from the fact that the influx of man's spiritual nature does in fact create phenomena in the world which science can attempt to examine and predict but which it will never control. By the same token, it will also recognize that the individual experience of its subjects is also partially determined by conceptual experiences which derive from scientific understanding and rational reaction to the world as it is known.

In the place of trivializing the true nature of man's participation in the world and his transcendence of it, organismic psychology venerates man by taking him as the womb of scientific creativity and spiritual originality.

5.3 SCIENCE PHILOSOPHY AND PSYCHOLOGY

At the beginning of this chapter it was indicated that the separate areas of science, philosophy and psychology could be fashioned into a meaningful whole by a coordination of the basic ideas of each discipline. At this juncture, it is more easily asserted that the key element in both science and philosophy is the role of the individual sentient human being. In discussing science, which historically has been most closely identified with the material half of man's awareness, the modern innovation in the character of our understanding of that enterprise centered around the role of the creative intellect of the puzzle solving scientist. This critical factor in the whole scheme of science was long ignored as a result of the same external bias that frustrated attempts to create a human scientific psychology and also caused great consternation among the more poetic and artistic individuals of the modern era.

In discussing the metaphysics behind philosophy, the common metaphysical outlook of materialistic science and past philosophy was apparent. The problem of greater unity in this area was resolved by the advent of organismic metaphysics which asserts that the whole aim of any intellectual enterprise is the elucidation of experience which is important to people. This basic assertion was amplified in the further requirement that the starting point for such an analysis is, in fact, the observation of the experience itself. Once again, the statement was made that it is the character of the individual that has priority in the development of scientific understanding. This time however, the statement is stronger. Whereas the discussion of the character of science focused simply on the role of the creative intellect, the discussion of organismic metaphysics includes that minor realization in the sweeping changes which it proffers for the character of the scientific enterprise itself. An understanding of science which venerates the creative intellect requires the further elucidation of a metaphysics which can support both halves of the reality of man's existence which are transcendent in relation to the awareness of the individual's immediate experience.

That both previous discussions have converged upon the role and nature of the individual is particularly fortunate for a discussion which is to touch upon the relationship of science, philosophy <u>and</u> psychology. It is with this type of background that we can hope to develop an approach to psychology that harmonizes with the past traditions of science, philosophy and psychology and yet also adds to these particular traditions the penetration of insight which results from an expanded consideration of the personal reality of internal experience.

5.3.1 ORGANISMIC PSYCHOLOGY

The psychology which one can envision as growing out of the organismic metaphysics will, none-the-less, be a specialized form of human experience with its own aims, methods and standards which will serve to distinguish it from other areas of science and philosophy. Psychology however, has the unique task of not only recognizing that its prime subject matter is the sensitive reaction of the experiencing individual but also, that the dynamic character of that sensitive reaction is a joint product of the individual's faith in the character of the ultimate realities referent to the spiritual side of life as well as the particular existential situation that the individual finds himself in the material world. Psychology will need to recognize the causitive character of both these poles of being. Past psychology has sought the "message" for man as a result of his situation in the world, future psychology can admit the partial validity of that approach while including it in the further realization that man is also the medium by which the message of the spiritual side of life is conveyed.

Actually, traditional psychology can be said to have realized the necessity of search for some permanence in beingness, and to have further recognized the need to seek out some universally normative core of understanding that will satisfy the desire for expanded awareness of the conditions of life. The history of psychology which has been considered in earlier sections amply demonstrates this fact. The contention which is asserted here is that those efforts, which were also carried forth by a desire to expand the individual's awareness of existence, have pushed the limitations of traditional methodology, epistemology and metaphysics to their natural culmination in a world-view which is essentially devoid of awareness of the reality of man.

The intent of the organismic approach in psychology is not to suggest that some new desire and ability, of which it was previously devoid, has suddenly been visited upon mankind. On the contrary, its assertions, though revolutionary, are far more humble than that. As is evident from the historical discussions of earlier chapters, the basic ideas involved in both the materialistic and organismic understanding of man and the world have a long and intimate history. The organismic interpretation is a variant which is formed by the modification, sometimes more and sometimes less, of certain key assumptions of the background of belief that animated the era of materialistic science. Thus, its new ventures in psychological understanding are related to past traditions as is each generation to its predecessors. That past psychologists have largely sought the normative understanding of man by regarding only his material aspects was simply a product of the metaphysical-existential materialism of the age. A more complete modern psychology is required to develop a description of man which involves both aspects of the whole individual.

Thus, the differences between science, philosophy and psychology can be portrayed by examining the relationship of science and philosophy to the total human being which is the basis of the organismic approach to psychology. This sort of perspective is important because it requires the nature of psychology to be open to both the spiritual and material aspects of being. The psychology of the organismic whole is not however, an attempt to encompass the complete understanding and approach to the spiritual aspect of man since it is obviously the task of religion to be concerned with the ultimate being and value of the universe. What this perspective does for psychology however, is to open its consideration of the factors which derive from this expression of the ultimate and insures acceptance of the reality of this aspect of man. That is to say, a psychology which includes this premise will be protected from the debilitating task of attempting to find the whole of man reflected in his isolated parts. In its relation to the coordination of the rational and material aspects of man, organismic psychology will be freed to directly and unflinchingly focus upon the problems of existential meaning in the material world and will be able to utilize the theoretical problems of the structure of reality with which the physical and biological sciences deal as important resources in the quest for increased self-knowledge of the material side of life. Therefore, in line with the limitation which keeps psychology from encroaching upon the explicit territory of religion, there is also a prohibition against ignoring the meaning which is to be derived from the more quantitative physical and biological sciences.

In this characterization of the tasks of organismic psychology the attempt has been made to establish the role of psychology as a sort of mid-point in man's attempts to understand his being. The concern has been to show that the divergent poles of being can be viewed internally or externally. Man's awareness of his self-transcendence as it relates to his nature and purpose and his awareness of the fact that the physical world transcends his knowledge of it is an internal point-of-view which has its counterparts in the external cultural orientations which are offered by the great traditions of religion and science. It may therefore be said that the true unity of religion and science is found at the point where the implications of the two views meet in the experience of the individual. Since psychology has the task of recognizing both of these aspects, considering this relationship in greater detail will be a fitting close to this initial discussion of the psychology which is indicated as a result of the development of the organismic approach.

5.3.2 EXPANSIONS ON THE THEME OF ORGANISMIC PSYCHOLOGY

In elaborating the character of the psychology which occupies the mid-scale position in terms of man's awareness of the spiritual and the material, it is evident that such a psychology would have many diverse and important functions. If we truly attempt to construct a psychology which is sensitive to and descriptive of immediate experience, then we will be required to not only draw from both sources but also to criticize those discordant aspects of the interface between the scientific and the religious points-of-view. In this sense, psychology will have a closer relationship to each of these enterprises than they will have to each other. It is also true that in its co-ordination of outlook between the two poles of being psychology will find that science is most useful in areas where the spiritual perspective is of least value and that correspondingly, the strong points of spiritual influence are to be observed in areas where science is of smallest value. Again, since both of these enterprises are aspects of the unity of the individual they can be seen to summate meaningly in the expansion of awareness as long as their attributes and implications are in harmony.

It is quite natural that a main contribution of the scientific enterprise is to manifest a concern for physical survival and to help to insure the continuance and betterment of physical life. The direct outgrowth of this approach for theories of evolution is obvious since the idea of physical survival is the central aspect of what is considered to be the traditional explanation of the process of evolution. Yet, man, at least, is also vitally concerned with the idea of living well in addition to simply living. There is, in fact, a qualitative aspect to the processes of man's life that is not touched upon by the explicit methods of naturalistic physical science. Specifically, the great issues of meaning and purpose are almost completely opaque in relation to the type of illumination which is derived from the quantitative precision of scientific investigation. The ultimate concerns which are typical of the spiritual aspect of man are least explicable in terms of quantification and observational testing.

Given this type of approach, it is not necessary that we formulate a strict dichotomy between the spiritual and material aspects of being as Fechner did. By virtue of the organismic metaphysics, it is evident that the material and spiritual are two aspects of the same sensitive individual and are in fact united in that sensitive individuality. Where Fechner was constrained to see a clear line of demarcation between the two aspects of being, a sort of linear interface that could be submitted to quantitative expression, the psychology of the organismic approach finds as its primary datum the wholeness and completeness of the experiencing subject himself. In such a psychology, science can help to provide the operational exemplification of the content of experience which is derived from the spiritual aspect of man's transcendent self, but it cannot yield direct answers to matters which refer primarily to the higher-order transcendence of that nature. However, as if to redress the balance, this view of psychology is also required to recognize that while the content of spiritual existence may well add to the meaning and ultimate direction of the scientific investigation, it does not also provide explicit insight into the details of the observable physical world.

To carry the comparison to another level of detail, we can assume the position of this sort of center-scale psychology and consider the character of various issues as they interact in our sensitive experience which is a joint product of both poles of being.

Such an outlook finds the emphasis of facts to be primarily a virtue of scientific understanding in the material world whereas a concern for values is surely a product of the spiritual side of being. Where material science venerates physical survival, spiritual insight prizes fulfillment of existence. Science finds peak experiences in statements of precise theory, spiritual concerns focus on the final generality of knowledge. Ideal science is expressed in terms which are completely devoid of reference to a person, spiritual matters are completely devoid of meaning if the person is not included. Science requires public verifiability of its data, spiritual insights are often not reproducible and certainly are not publicly verifiable in the same sense. Unique events have no meaning for normative science whereas uniqueness is apt to be the hallmark of an experience which can alter the whole basis of the spiritual life of an individual or, for that matter, mankind.

We are confronted then, with a complex being that is complexly aware of many levels of generality. In our earlier consideration of scientific thought, the ability to test a theory was seen as closely linked to the generality of the assertions it was making about the nature of physical reality. As the generality of statement increased, the difficulties of actually verifying the theory became such that no true verification was possible because a "whole network of ideas" is always implicated as a result of the generality of statement. In this same way, we can look to the possible generalities of the spiritual side of life as also entailing a large network of interconnected beliefs which also make precise examination or refutation impossible. As a result of this sort of understanding of the nature of the enterprises which cluster around the two main aspects of being, organismic psychology can be seen to have the task of not only being concerned with the complex interrelations of the various avenues of understanding but also and more importantly, of fostering an increased appreciation, among those whose life it touches, of their personal role in the expansion of man's individual and collective awareness of his transcendent nature. With organismic psychology, faith in man and his transcendent destiny is now added to the centuries long traditions of faith in reason and faith in science. The art of being and the process of becoming are wedded in the unity of the experient individual.

CHAPTER SIX

6.0 THE PROBLEM OF PURPOSE

It is possible to summarize many of the discussions that have arisen in connection with earlier topics under the general heading of the problem of purpose. This topic provides an unusual opportunity to summarize key aspects of the organismic position while also affording the possibility of integrating other types of data from diverse fields into the general topic of psychology and education.

A recurrent theme of this presentation has been the importance of the role which is played by the background of belief that is the over-all orientation for the culture and the personal commitment of the individual scientist. Also, we have characterized the advent of the Whiteheadian organismic approach as a change of emphasis and outlook that amounts to what Thomas Kuhn would call a paradigm shift in the basic assumptions of science. These aspects of our past concern can now be combined into the task of formulating a basic orientation toward the problem of purpose. This orientation should not only masquerade as a paradigm shift in scientific inquiry must also make a basic statement about the appropriate background of belief which is required to support an augmented role for the idea of purpose as a meaningful explanatory parameter of scientific understanding.

Past discussions have been freely critical of the scientific and philosophical problems which are created in the wake of the mechanistic approach to understanding man and his world. The problems of determinism and reductionism have been cast as major factors in frustrating the growth of increased appreciation of the nature of life and the true character of man. Against these overpowering forces it has been impossible to do much more than to assert some atavistic sounding form of spiritualism or an even weaker attempt to instill a form of vitalism as an explanation of the living phenomena of the world in which we live.

In attempting to surmount these limitations we have seen that the dominant response of those who have considered the full meaning of human life has been to divorce the explanatory or epistemological structure of their system from the metaphysical basis which was designed to explain dead matter and the immutable laws by which it operated. As a result of this basic inconsistency between an explanation and the fundamental principles upon which it rests, there have been those, like Bertrand Russell, who, as we have seen, were forced to conclude that man is the "product of causes which had no provision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves, and his beliefs, are but the outcome of accidental collocations of atoms." Against such views which assert the belief that life is purposeless and without meaning, there are those who believe that purpose and meaning are only to be found in the reality of man's existence and that the rest of the cosmos is meaningless. Thus, the existentialist is concerned with man's "thrown" condition or the "thrown" plight of man from which existential anxiety arises.[281] For the man who takes himself as the epistemological center of the world there is only a strange confusion as to his metaphysical relation to the rest of the world as long as that basis is defined along the lines of the materialist cosmology. Why else would the existentialist find meaninglessness and emptiness, loneliness and isolation to be some of the major anxieties he must face as a result of being thrown into his plight in the world?

These divergent interpretations of man and his world and also those which have marked the difference between psychology interpreted as a natural science and psychology interpreted as a human science have the common property of arising from the basic inconsistency between man's organic awareness of himself and his mechanistic understanding of the world about him. Since there have been those who can find no meaning or purpose anywhere, and those who can only find some meaning and purpose in their self-awareness, it is clear that to add significantly to the understanding of

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[281] Bugental, The Search for Authenticity, Chapter 2.

meaning and purpose we must portray them as elements of the world itself. Here, we come to the central idea with regard to purpose as it functions in the organismic context, and are now in a position to delineate the basic assumptions of the following discussion of the problem of purpose.

The position taken with regard to the general topic of purpose is: a) that the world which we know in science and in human experience is both purposeful and full of meaning; b) that its proper understanding requires a teleological interpretation but one which is also consistent with contemporary scientific knowledge; c) that this framework denies philosophical views which are primarily concerned with substances and the laws by which they were invested with attributes and focuses upon the fact that that which endures is the actuality of patterned action, action which must be characterized both in terms of its internal and external reality; d) that to the scientific view which focuses upon observed processes and structures but which does not see the inner life of organisms we must add the metaphysical intuition which recognizes that there is a drive in things--an advance in the universe. This advance is the expression of the fundamental creative urge which underlies the evolutionary hierarchy of valuing, experiencing organic beings--beings whose own reality consists in the dynamic realization of their potential; e) that it is in the realization of this potential, which is a process basic to all forms of life, that the experient individual actualizes his own self-transcendence by seeking his satisfaction in the experience of increased subjective value.

Thus, we have purpose as a statement of the primary process in the universe. No longer is it necessary to conceive of the universe in static terms. We can recognize the advance in the universe as a basic characteristic of the cosmos. Objectively we can view this advance in terms of increased complexity of structure, subjectively it can be viewed in terms of the increased satisfaction which is felt by increasingly sophisticated experient individuals. This conceptualization of purpose is also a way to describe the dynamic reality of social processes in which the unity of the whole functions meaningly in the fulfillment of the purposes of the interacting parts. It then becomes a statement of the interconnectedness of societies and the series of events which comprise the society. But this interconnectedness can be seen in two ways. First, it is an expression of the contemporary relation between the part and the whole to which it belongs. In this, it is something of a statement of horizontal relationship. Second, it can become an expression of a directional interconnectedness in which the idea of purpose can function meaningly in the description of the emerging hierarchical forms which we observe as the transition of complexity from atoms to Adam.

With these thoughts in mind, we can turn to the consideration of specific aspects of the general topic of purpose with the intention of relating what we know scientifically and what we know experientially to the view that the evolutionary cosmos is a purposeful rather than a purposeless process.

6.1 A BASIC CONTRAST BETWEEN PHYSICAL DETERMINISM AND EVOLUTIONARY PURPOSE

In a series of lectures given in 1929, Whitehead asserted that:

> The function of reason is to promote the art of life.[282]

This assertion provides a definite contrast to an important aspect of theory in the physical sciences contained in the science of thermodynamics. Thermodynamics is something of a manufactured science in that its explanatory power is "brought about by principles operating above the plane of laws, principles unable in themselves to generate laws but able to give them scope and substance."[283] Notwithstanding the fact that its central concepts are rather more like

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[282]Whitehead, The Function of Reason (Boston: Beacon Press, 1958), p. 4, Whitehead's emphasis.

[283]Margenau, The Nature of Physical Reality, p. 212.

principles than the usual scientific law, thermodynamics is commonly spoken of as containing laws. The combined operation of two of these laws characterizes what Whitehead refers to as the "stealthy inevitableness" of the "degradation of energy" in which, the "sources of energy sink downward and downward."[284] In contrast to this over-all decay of physical nature, the rising tide of biological evolution is seen to be a force of equal importance and opposite direction. From this perspective, it is a greater appreciation of the true function of reason that can provide an insight into why the trend of evolution has been upwards while the trend of the physical universe appears to be downwards.

We can make the contrast between the physical and biological aspects of nature more explicit by touching upon the two laws of thermodynamics that are in question here.

The first law of thermodynamics asserts a variant of the law of conservation of energy and gives elaborate meaning to the quantitative relationships involved in physico-chemical energy exchanges. It is the second law that is responsible for adding the downward direction to these energy exchanges. This law, which is also known as the concept of entropy, is a statement of the irreversibility of thermodynamic processes. That is, it states that

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[284] Whitehead, op. cit., p. 1.

heat can naturally flow in only one direction, from hot to cold. On this view, since each physico-chemical change involves a transfer of heat energy, the amount of heat energy, or the difference between hot and cold, is gradually being diminished; therefore, there is a fundamental irreversibility of the cosmos which will one day result in its "heat death." Further inquiry into the details of the thermodynamic argument is not necessary to support the over-all assertion which is important in this context. Our concern is simply with the fact that what we know of the material universe indicates that it will not be able to continue on its way indefinitely. Somewhere in the distant eons of time, the cycle of the material world is destined to end in a state of unusable energy where there is only a stultifying sameness among all sources of energy--a unity in which there is no diversity and therefore no life.

Whitehead is not the only one who sought a contrast to the laws of the material universe in the function of reason. For example, in speaking of the growth of reason as the elaboration of greater consciousness, Teilhard de Chardin finds a similar counterpart to the function of entropy:

> This absolute of physics [entropy] has thus far not only resisted all attempts at relativisation, but, if I am not mistaken, tends to find its counterpart in a current moving in the opposite sense, positive and constructive, which is revealed by the study of the earth's biological past: the ascent of the

> Universe towards zones of increasing improbability and personality. Entropy and life; backward and forward: two complementary expressions of the arrows of time.[285]

In another and more poetic expression Teilhard characterized views of nature which fail to recognize that the trend of evolution has been upwards as being constrained to see life and reason as a phenomenon

> . . . that only bursts to be extinguished; an eddy rising on the bosom of a descending current. . . .
>
> So says science: and I believe in science: but up to now has science ever troubled to look at the world other than from without?[286]

Thus, once again, we have the standard physical interpretation of the world from without contrasted with the deep seated requirement to appreciate the within of things that is responsible for the upward trend of evolution. In this case however, we have perhaps the ultimate form of the contrast since the example of entropy and life is surely one of the fundamental dualities in the universe. Teilhard calls the ordinary observable kind of physical energy "tangential" to the process of complexification and intensification which is indicated in the rise of life processes and which he views as the product of a "radical" energy.

In speaking of the character of living things, Jean

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[285] Pierre Teilhard de Chardin, The Future of Man (New York: Harper and Row, 1969), p. 51.

[286] Teilhard de Chardin, The Phenomenon of Man (New York: Harper and Row, 1961), p. 52, Teilhard's emphasis.

Piaget concluded in his extensive essay on the relations between biology and knowledge that:

> . . . the fundamental reality about living things is constituted neither by timeless structures, . . . nor by a historical succession of chances or crises. . . . All that needs to be said here is that in all levels, whether historical stages or echelons of some organizational hierarchy, we find the simultaneous intervention of exogenous factors, causing disequilibra but also setting off "responses" and endogenous factors, producing these responses and acting as equilibration agents.[287]

Since Piaget's concern is to reveal the similarities between organic processes and cognitive processes, his assertions about the function of reason do not go as deeply into the heart of the matter as do those of Whitehead and Teilhard. Nevertheless, it is clear that his understanding of the "fundamental reality of living things" also implicates the role of internal factors in the regulation of transactions with the environment. In fact, Piaget's thesis is much stronger than mere implication; a guiding hypothesis of his entire approach to psychological theory is that cognitive functions are an extension of organic regulations and actually constitute a differentiated organ for regulating exchanges with the environment. "Cognitive processes seem to be," Piaget writes,

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[287] Jean Piaget, Biology and Knowledge: An Essay of the Relations Between Organic Regulations and Cognitive Processes (Chicago: University of Chicago Press, 1971), p. 347.

> at one and the same time the outcome of organic autoregulation, reflecting its essential mechanisms, and the most highly differentiated organs of this regulation at the core of interactions with the environment, so much so that, in the case of man, these processes are being extended to the universe itself.[288]

Piaget's thesis, for which he marshalls a considerable amount of biological and psychological evidence, is important in this context because it asserts the absolute connection between cognitive processes and life processes. In making this assertion Piaget also finds it necessary to point up the limitations of two important aspects of our traditional understanding of evolution, i.e., his references to the uselessness of views which are based either on "timeless structures" or "a historical succession of chances and crises." We can pass over reference to the problem of "timeless structures" here since it is recognized to be essentially a philosophical problem, which is eliminated once we accept the evolution as a viable concept, and focus our main concern upon the second aspect of his criticism.

Piaget's assertion that the "fundamental reality about living things" is not to be found in "a historical succession of chances or crises" is simply a flat denial of the standard evolutionist doctrine of "the survival of the fittest" which is said to be a joint expression of the twin processes of random variation and natural selection. The

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[288]*Ibid.*, p. 26, Piaget's emphasis.

problem with this traditional view is that in focusing upon the idea of mere survival, it misses the main characteristic of life which is to reach beyond survival. On this same point, Whitehead asserts that the fallacy of this doctrine "does not consist in believing that in the struggle for existence the fittest to survive eliminate the less fit," this condition he is willing to accept as a plain fact whose evidence is too obvious to dispute. "The fallacy," rather, "is the belief that fitness for survival is identical with the best exemplification of the Art of Life."[289] Whitehead's intent here is to draw attention to the fact that many things survive for great periods of time and that the more complex organisms are, the lower appears to be their survival value in relation to other organisms. This is the same point Teilhard was making when he spoke of "zones of improbability and personality" as being the second expression of the universe and the complement to the condition of entropy. Obviously, there is an important sense in which the traditional doctrine is true since it does appear to offer an explanation of the process by which the struggle for existence between organisms can produce the survival of some at the peril of others. We are, instead, searching for a more general principle--one which will offer some account of the principle (s) by which

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[289]Whitehead, The Function of Reason, p. 4.

such complex organisms ever evolved in the first place.

Why has the trend of evolution been upwards?[290] This key question goes directly to the heart of the matter. Since standard accounts focus primarily on the without of things, it is natural to see the environment as being the responsible agency by which the rules-of-the-game are imposed upon those who must play the game in order to exist. However, the central factor of upward evolution indicates that the rise of life is accompanied by an increasing power to modify the environment and which acts to diminish the environments' ability to modify the organism. A portion of this meaning is contained in the traditional view; yet, it is also true that the role which is ascribed to the internal factors is usually negligible.

In light of the previous discussions of philosophy, science and psychology, it is natural that selective emphasis has been placed upon the exogenous aspects of the organisms' relation to the environment and that the endogenous reality of organic life should be largely missing from man's accounts of the history of the world. Surely, since the dominant trends of man's efforts to understand his own nature, of which he is directly aware, have largely failed to capture the fullness of lived experience and have often denied their own existence or proclaimed their own

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[290] Ibid., p. 7, emphasis added.

absurdity, we have only the narrowest of grounds on which to expect the scientific description of evolution to yield insight into the increasing ability of organisms to modify their environment.

Modification of the environment requires more than the basic notion that life's aim is to be alive.

> In fact, the art of life is _first_ to be alive, _secondly_ to be alive in a satisfactory way, and _thirdly_ to acquire an increase in satisfaction.[291]

It is from this perspective that Whitehead explains that the function of reason is to promote the art of life, since "the primary function of Reason is to direct the attack on the environment."[292] Whitehead is quick to point out the heretical character of this view since it demands that reason be considered to be an element in experience that functions to direct and criticize. It is the urge towards goals which are potentialities for actualization and not yet actualized in fact. But what is this except a statement of the fact that there is a certain type of "freedom" associated with the phenomena of life?

The point here, is simply another statement of the central argument that animated previous discussions. Here however, by contrasting the downward entropy laden processes

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[291] _Ibid._, p. 8, Whitehead's emphasis.

[292] _Ibid._

of the material cosmos with the upward expansion of life as represented in evolution, we find a primary ground upon which to assert the limitations of the methodologies and metaphysics of the physical sciences. There is an absolute requirement to recognize that the mysterious counter-agency which is the impulse for the energy of the universe to run upwards is not meaningly treated within the materialistic framework.

By applying the idea that the growth of reason is a way to characterize the evolutionary process, principles can be developed which are in harmony with the fact that there has been a gradual development, over vast periods of time, of increasingly complex beings which are increasingly effective in modifying their environment. The most important aspect of this view is that reason is elaborated beyond the everyday mode of problem solving in the contemporary world and is seen in the function of dealing with the puzzles of existence, of being that agency in the conduct of human affairs which also underlies the ability to direct behavior toward desired ends. This aspect of reason deals with the problem of purpose and the notion of final causality, those very aspects which were least congenial to views of the world which relied on physical principles.

However, it is well not to get ahead of the story. Before we begin to talk of the character of human life as it impacts immediately upon issues in personality and educational theory it is necessary to consider principles which can account for the emergent evolution of life. Again, the basic contrast which is the foundation for this discussion is that the old notion of causality in the physical world, which related physical effects to physical causes, can only end in the realization of the downward trend of the physical universe. In place of physical description, we are searching for organic principles which are descriptive of more than mere survival and which, in fact, encompass the expansive upward development which has led to mankind. This view sees evolutionary emergence as a value creating system of structured processes which are capable of self-transcendence and recognizes that the world which we know in our science is both purposeful and full of meaning.

A good portion of the following discussion of the principles which apply to the upward tendency of evolution can be seen as an attempt to consider the scientific evidence which fills the gap between the organic and the physical in the following description:

> In our experience we find appetition, effecting a final causation towards ideal ends which lie outside the mere physical tendency. In the burning desert there is appetition towards water, whereas the physical tendency is towards increased dryness of the animal body. The appetition towards esthetic

> satisfaction by some enjoyment of beauty is equally outside the more physical order.[293]

Whether we refer to the low-order or the high-order aspects of appetition, the craving for water or the ardor for aesthetic achievement, we are dealing with the problem of interweaving efficient and final causation into a coherent system. In earlier discussions, we have treated the problem on a philosophical and metaphysical basis, here we can develop some correlation between that philosophical perspective and the present-day scientific understanding of evolution.

As we begin to consider the evidence which supports the view that evolution can be interpreted as an increase in the power to manifest purposive behavior, it is appropriate to call attention to an explicit bias which is held by the author. Rather than being animated by the purpose of attempting to prove that life processes can be completely explained in physico-chemical terms and therefore are purposeless, this author is motivated by the purpose of demonstrating that the idea of purpose is not only valid, but also essential, if we are to conceive a basis for the resolution of the two central antimonies which Gordon Allport saw as the prime impediments to formulations of meaningful psychological theory--the issue of dualism and the problem

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[293] Ibid., p. 89.

of purpose.

6.2 A METHOD FOR INTERPRETING THE PURPOSEFUL COSMOS

In attempting to synthesize the scientific knowledge and metaphysical intuitions of earlier sections, we can start from the explicit premise that an adequate metaphysics must account for both the inner and outer aspects of experience. In this light, the "dualism" which derives from the analysis of the duality of human experience, i.e., the internal mental and external bodily aspects of experience, is the most profound clue to the nature of the whole of reality. This type of dualism applies to the highest levels of the evolved cosmos while, at the same time, affording increased understanding of the lowest levels of that evolution that are described in the twin concepts of entropy and life. The hierarchical reality suggested by this view indicates that we should look for aspects in the relationship which are indicative of the transition to higher forms of consciousness. Teilhard expresses the basic Whiteheadian insight into the use of concepts in science which are analogous to some aspects of human experience as follows:

> It is impossible to deny that, deep within ourselves, an "interior" appears at the heart of things, as it were seen through a vent. This is enough to insure that, in one degree or another, this "interior" should obtrude itself as existing everywhere in nature from all time. Since the stuff of the universe has an inner aspect at one point of itself, there is necessarily a <u>double aspect to its</u>

> *structure, . . . co-extensive with their Without, there is a Within to things.*[294]

Our concern is to focus upon the "one degree or other" in which the "interior" obtrudes itself as existing everywhere. This view can be characterized as a panpsychism which asserts that the duality of inner and outer applies to the whole range of organisms from the lowest to the highest. In the extreme case, we recognize that experience for atoms is vastly different than for man. This however, should not hinder the realization that the idea of an organic event means that there is always a possibility for a type of internal awareness of being which is appropriate to the level of process of the being involved. That all levels may be said to have some degree of this self-enjoyment demands that there should be principles which describe how such an arrangement can be structured.

Whitehead has proposed a rough division of six major types of occurrence in nature which ranges from the first level of human existence, mental and physical, to the second level in which all lower forms of animal life are grouped. The third level encompasses vegetable life and the fourth is comprised of single living cells. The fifth and sixth levels refer to large scale inorganic aggregates

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[294] Teilhard de Chardin, *The Phenomenon of Man*, p. 56, emphasis added.

and the microcosmic events of modern physics respectively.[295] Of this hierarchical arrangement it is important to note that the various classificatory levels do not exist in sharp separation from each other. On the contrary, the repeated Whiteheadian assertion that all things influence each other can be said to demand that each level of being should be required by the others. This mutual implication predicts that the different modes of natural occurrence should fade off into the transition between levels; in the classification of real things it is always a hazardous process to attempt to draw a sharp distinction between levels of being.

6.2.1 STRATIFIED STRUCTURE AND ITS BOUNDARIES

The main problem in reaching a more satisfactory explanation of life processes is explaining the achievement which is represented in life's basic ability to contradict the dictates of pure physical processes. In life processes we recognize achievement and purpose as important factors which are not contained in inanimate matter. In physical and chemical descriptions of the world of matter, the concepts of achievement and purpose are meaningless. Similarly, one does not use these terms with machines which are the achievements of the human intellect and are constructed to

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[295] Whitehead, Modes of Thought, pp. 156-157.

suit its purposes. For machines we can only speak of performance and not achievement since the "achievement" of a machine is to extend the powers of human achievement via a specific performance.[296]

A prominent and consistent advocate of appreciating the irreducible structure of physical and life processes is Michael Polanyi, whose over-all position is quite similar to many of the arguments which have been advanced in earlier sections:

> Our comprehension of a living individual entails a subsidiary awareness of its parts which is not wholly specifiable in more detached terms. This understanding acknowledges a particular comprehensive--i.e., "molar"--achievement of the individual self. Since our knowledge of this molar function is not specifiable in "molecular" terms, the function itself is not reducible to molecular particulars; it must be acknowledged therefore as a higher form of being, not determined by these particulars. We can reach this conclusion by recalling that the understanding of a whole appreciates the coherence of its subject matter and thus acknowledges the existence of a value that is absent from the constituent particulars.[297]

Polanyi's use of this basic position is, however, a highly developed system for the comprehension of the structure of living things. In particular, he makes it evident that a

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[296]Defining the problem of purpose in relation to machines is best delayed until the problem of purposive behavior can be treated as a complete unit. See Section 6.5. Delaying the introduction of the concept will not, however, hinder the development of the more general topics.

[297]Polanyi, Personal Knowledge, p. 327.

biologist in dealing with living things must use a "logic of achievement" to describe phenomena which are not factors in the physical sciences but which, in fact, are the very subject matter of biology. For example, there are no acts which achieve a purpose in physical and chemical processes; however, in living organisms we can recognize both physical and chemical processes and purposive acts.

Polanyi develops many explicit contrasts relating to the concept of levels of functioning in which the same logical structure that pertains between inanimate nature and nature alive can also be found to exist between other levels of functioning. A favorite Polanyian example is the situation which pertains between man and his machines. A machine for Polanyi is something which has been constructed by man for some purpose. He points out that the structure and working of machines are shaped by man while their material and the forces which operate them obey the laws of inanimate nature. From this relationship he concludes that machines operate under the control of two distinct principles: the higher, or the principles of the machines' design and the lower, or the physical and chemical processes appropriate to the materials involved.

In describing a wrist watch by this type of argument, Polanyi points out that the task of keeping time via the uncoiling of a spring which is controlled by various parts fashioned for that purpose, is carried out by principles of operation which can not be described in terms which apply to the inorganic nature of the parts. Even a complete physical and chemical topography of the watch would not reveal that it is a device for telling time. Such analysis can only reveal the composition of the object. Clearly, the operational principles of the watch transcend the chemical processes of its parts and are not amenable to description in those terms. Applying this same logic to the problem of physiologists and biologists, we have:

> Any coherent part of the organism is indeed puzzling to physiology, and also meaningless to pathology, until the way it benefits the organism is discovered. And I may add that any description of such a system in terms of its physical chemical topography is meaning-less except for the fact that the description may covertly recall the system's physiological interpretation--much as the topography of a machine is meaningless until we guess how the device works, and for what purpose.[298]

From this general relationship, Polanyi asserts that the living organism, like the machine, incorporates two different principles of operation to account for the phe-nomena which are observed on different levels. This leads to the concept of "boundary condition" and an important characteristic of the logic of achievement which applies to a hierarchically organized system of interdependent but

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[298] Polanyi, Life's Irreducible Structure in Knowing and Being, Marjorie Grene, ed. (Chicago: The University of Chicago Press, 1969), p. 227.

irreducible levels.

Boundary conditions describe the relation between the higher-order organizing principle and the lower order processes which are thereby harnessed for the transcendent purpose. There are two types of boundary conditions. The first type is the type we have already discussed; namely, the situation in which restrictions are imposed of the lower order processes to harness them to our purposes. In this situation, the primary interest is on the effect of the boundary condition and not on the laws by which the lower order operates. An example is the strategy that one would use in a game of chess. The strategy imposes boundaries on the number of possible moves which follow the laws of chess; however, our interest is not primarily in the specific rules which apply to the various pieces on the board but in the strategy (the boundaries) which are superadded to the basic laws. The meaning is in the strategy and not in the moves as examples of the laws. The same situation is true of a painter or a sculptor who imposes boundaries on his material so that we can appreciate them (the boundaries) by way of being interested in his creation and not in the material as material. These boundaries are referred to as "machine boundaries" since the interest is always "in the boundaries which are imposed by a comprehensive restrictive power rather than the principles harnessed by them."[299] The second category of boundary is known as a "test-tube" boundary because it is the difference between constructing a machine and setting up an experiment. In the latter case, the primary interest is not in what is imposed on the material but is rather in the material itself. That is to say, restrictions are placed on the lower order phenomena in order to observe their behavior.

"A boundary condition is always extraneous to the process it delimits,"[300] Polanyi asserts by way of explaining that the structure of a machine is not to be described in terms of the laws which are harnessed. With both types of boundary, it is true that the laws of physics and chemistry or the type of materials available for construction do not determine the interest or the purpose of the scientist or engineer. An expanded example of this relationship and one that makes the applicability of the argument to multi-leveled hierarchies more obvious is provided by the following example which demonstrates that each level of the hierarchy relies upon the workings of the levels below it but is nevertheless irreducible to a description in terms of those lower levels. Polanyi demonstrates this type of hierarchical structure by considering the five levels that make up a spoken literary composition.

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[299] Ibid., p. 226.

[300] Ibid., p. 227.

> The lowest level is the production of a voice; the second, the utterance of words; the third, the joining of words to make sentences; the fourth, the working of sentences into a style; the fifth, and highest is the composition of the text.[301]

Clearly, the principles which operate on any one level are under the control of the next higher level. "The voice you produce is shaped into words by a vocabulary; a given vocabulary is shaped into sentences in accordance with a grammar; etc.."[302] This example demonstrates the principle of dual control which applies to the various levels of the hierarchy. On the one hand, there are the laws which control by applying directly to the elements themselves, i.e., the rules of grammar or of chess while, on the other hand, there are controls which are imposed by the laws of the powers that control the entity which is formed by the elements in the construction.

In examining the relation between levels of the hierarchy, it becomes evident that "such multiple control is made possible by the fact that the principles governing the isolated particulars of a lower level leave indeterminant conditions to be controlled by a higher principle."[303] In the example of communication given above, this means that

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[301] Ibid., p. 233.

[302] Ibid.

[303] Ibid.

the words of a vocabulary leave open the ability to combine into an indefinite number of sentences which are controlled by the laws of grammar.

With this sort of logic, we can return to the over-all classification which Whitehead set up regarding the six major divisions of the actual hierarchy of life processes. In the sequence of levels which places living beings near the top of the hierarchy, we can assert that the processes on the lowest levels are caused by the forces of inanimate nature and that the operation of higher levels is only possible by virtue of boundary conditions which are left open by the laws of inanimate nature. Thus, vegetative life is seen to operate in intimate contact with the open boundaries of the inanimate world while at the same time supporting, by virtue of its own open boundaries, the possibility for the development of the muscular operations of animal life. And so it goes, on up the line until in man we have the ability to appreciate still higher principles of moral, esthetic and spiritual value.

This view is also descriptive of the unity and interconnectedness of nature. Since each level relies on the one below it and also delimits the operation of the lower level by channeling the operation of its principles into the unique character of its own functioning, there is a system of graded control in which the control is transmitted successively downwards to the lowest level. In line with our earlier discussion we will use this view in the service of an outlook that describes the evolutionary process as one which represents the emergence of an increasing degree of complexification, the development of new stages of life in which each new level represents a distinct principle of operation that can harness the open boundaries of the level below it while at the same time is not also reducible to those principles.

In Whiteheadian terms, we can characterize the operation of each level as entertaining the capacity for some form of self-expression in which the latent potentiality of the level below it is awakened into realization into its level of being. Thus, the latent potentiality of lifeless matter is made manifest in the functioning of vegetable life, while the animal grade is seen to add yet another ability by virtue of its capacity to exceed the average expression of survival of the vegetable world and add to it the particular aim at value as manifest in its ability to modify the environment. In this sense, it is possible to assert that each basic element of inanimate matter is possessed of a capacity to express the virtues of the universe; every atom of the interconnected physical universe possesses or reflects all of the virtues of life. It is also true that upward press which is the countertendency to the increase of entropy or "negative entropy" as it is sometimes defined, is the product of a single power which animates and dominates all things. Whitehead's characterization of the function of reason as promoting the art of life is perhaps only a first approximation of what that "radial" energy of the evolving cosmos might be; however, it seems sufficient for present purposes in that it permits greater theoretical coherence in views about evolution and ultimately about psychology.

To make the application of this hierarchical view to psychology more explicit, we can recur to the idea of "inversion" that has been expressed in many and varied contexts ranging from the eighteenth century to present times. This time we can treat the topic in a new way; that is, from the perspective of a hierarchically organized structure of interdependent and irreducible levels. By utilizing the familiar concept of within and without, we can contrast a relatively low level of the hierarchy to an upper level of the hierarchy as follows. At the level of nonliving entities, it can be said that the average character of the entity exists in total conformity with the laws of nature, there is no individuality of expression and no choice but to conform to the formalities of the laws of nature--there is the "physical tendency towards increased dryness of the animal body." On the other end of the scale, we have the reality of human individuality that is so far removed from the compulsion of physical law as to be unaffected by them--"the appetition towards esthetic satisfaction . . . which is outside the mere physical order." While it is clear that the individuality of human expression is also constrained by these formalities, it also passes beyond them to the realization of purpose and the achievement of intimate and delicate forms of expression.

Thus, the growth up through the hierarchy of an increase in the function of reason is also a growth which attributes greater emphasis to the function of the within of things as represented by the emergence of new comprehensive principles of operation which apply to each new level. It is within this sort of a context that Whitehead asserted:

> Consciousness is the first example of the selectiveness of enjoyment in the higher animals. It arises from expression coordinating the activities of physiological functionings.[304]

We can come to the point of this treatment of inversion in the following way. In the hierarchical view, consciousness first arises from "expression coordinating the activities of physiological functionings" and it is not until we get to the most evolved levels, i.e., mankind, that the ability to formulate reference to the environment

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[304] Whitehead, Modes of Thought, p. 29.

in symbolic terms is manifest. Obviously, this agrees with conventional interpretation but it also passes quite glibly over the essential character of this relationship. In terms of our true relationship with the world of nature, the organic permanences which are derivative from lower levels of consciousness are actually of far greater permanence than the ordinary type of relationship with the environment which we maintain by virtue of the outer powers of sensory functioning. Whitehead claims that "there is a baseless notion that we commonly observe those activities of nature which are dominant in our neighborhood," when in truth "the exact opposite is the case."[305] In other words, human and animal sensory apparatus are most attuned to that which is changeable in nature and not that which is permanent. Of course, this is simply another way of saying that human actions arise from the coordination of lower levels but also introduce a new level of individuality in terms of expression and reception that can be purposeful, intimate and emotional. However, it is also true that we do not easily discriminate the character of our dependence on our bodies unless there is some particular reason for doing so. Unless we have some sort of sickness or pain, some special signal from our lower order levels of connection with the world, we are quite content to rely upon the results of

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[305] Ibid.

sensory experience as being our most important contact with the world and to take the intimate connection and infinite complexity of our derivation from the physical cosmos quite for granted.

"The first principle of epistemology should be that the changeable, shifting aspects of our relations to nature are the primary topics for conscious observation,"[306] is the way Whitehead phrased the notion that the type of relation with the environment that animals maintain via their sensory apparatus is to be highly sensitive to the changeable elements in the environment. It is in the most changeable aspects of the environment that an animal finds the greatest opportunity to catch its food and also the greatest source of danger from other animals. Speaking of the importance of this sort of sensory contact with the world J. J. Gibson writes:

> It is clearly of biological importance for a sentient individual to be able to distinguish or discriminate plant from animal, prey from predator, own species from other species, and mate from rival. . . .
>
> The environment consists of <u>opportunities</u> for perception, of <u>available</u> information, of <u>potential</u> stimuli. Not all opportunities are grasped, not all information is registered, not all stimuli excite receptors. . . . The animate environment affords even more than the physical environment does since animals have more

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[306] <u>Ibid</u>.

> characteristics than things and are more changeable.[307]

The purpose of this discussion is not to dispute the pragmatic value of sensory experience in providing useful information about the environment. Further, it is obvious that this sort of information is also the type about which something can be done by the sentient individual, that is, he can respond to the environment in accord with his own desires. What is at issue here is the fact that the traditional tendency in philosophy, science and psychology has been to focus purely upon the data which are supplied by sensory experience and to assume that these changeable and superficial data represent the only way to understand either the reality of the physical world or the reality of man. This, in fact, was the dominant outlook throughout the entire era of materialistic science and was the basis for the naive realism which characterized pre-twentieth century science. As long as man was secure in the fact that he actually observed reality with his senses, that atoms were really indestructible and separate, that there was only one geometry of three dimensions rather than an infinite number of geometries and dimensions, etc., there was no problem with the epistemology and metaphysics which

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[307] James J. Gibson, The Senses Considered as Perceptual Systems (Boston: Houghton Mifflin Co., 1966), p. 23, Gibson's emphasis.

was built exclusively in terms of the absolute realism of sensory information. That view, of course, was scientifically exploded in the twentieth century and in the wake of those shattering revelations has come exactly the type of awareness which led to the view of the world as structured along organismic rather than mechanistic lines. What else is the so-called "Fallacy of Misplaced Concreteness" except a criticism of exactly this type of orientation toward the character of sensory data as being the sole source of information about the world?

It would seem that we have come rather far afield from our original discussion of the character of a stratified hierarchy. But have we really? Recall that we entered this discussion by attempting to explicate the character of the relationships that exist between various levels of a hierarchy while at the same time considering the whole hierarchy as the expression of an undefined yet plainly evident upward progression of greater and greater levels of consciousness. In this trek through the various levels we finally came to the contrast of human consciousness with lower levels of consciousness and asserted, in the process, that the human ability to entertain conceptual novelty that is free from any direct infringement by the boundary conditions which are determined by the physical world, was an outstanding characteristic of the station of man. Since human consciousness has burst through the limitations of animal instinct and is to be distinguished from lower levels by its ability to conceptually entertain unrealized possibilities in novel ways, we were led to consider the most important aspects of this most highly developed form of consciousness. To relate this discussion to the earlier material the topic was handled as an example of idea of "inversion" of experience that has figured so prominently in previous discussion. This time, it was the superficial character of sensory experience in relation to the other forms of consciousness that are also a vital part of man's true nature that was at issue. To be sure, the topic is far from exhausted but it has, however, served to bring the discussion to the desired outcome. Namely, the assertion that the level of consciousness which applies to man, that is, the reality of man, is not usefully described in philosophical, scientific and psychological terms whose primary contact with reality is maintained via an analysis of man's sensory understanding of the world about him.

As useful for worldly purposes as they are, it is an absolute certainty that the ultimate greatness of human life does not derive simply from the ability to take account of sensory data. However complex our analysis of these data may be and however abstract our systems of logic, philosophy, psychology, art, science, history, economics, etc., may become, sensory faculties are but the outer relation of man's inner being to the underlying necessities of his true nature. Analytical minds have been led to repudiate the deep intimacy of being because the vagueness of those depths did not harmonize with the fashionable fables about the character of an underlying reality which is only knowable via the method of clear logical analysis of discrete sensory information.

It is this type of understanding of the character of "inverted" knowledge that can begin to pave the way for the type of organismic approach to psychology that was introduced in earlier sections.[308] In those sections the topic was introduced in terms of the contrast between the material and spiritual aspects of existence that derived from extensions of the relationships between science, philosophy and psychology. In the present context we are making essentially the same point but from within the framework of an organismically inspired hierarchical characterization of the structure of reality. It is not possible to pursue the characterization of human consciousness which develops from this type of approach further at this point without also detracting from the immediate purpose of this chapter which is to consider the character of the scientific data which support the organismic position. Instead, we can conclude

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[308]Cf., Sections 5.3.1 and 5.3.2.

this introduction of stratified structure and its boundaries with the following example which is expressive of the more complete generality which separates man's understanding of reality from the immediate dictates of sensory experience.

Should it be objected that sensory experience and a clear logical intellect are in fact the primary aspects of man's reality and his only means of seeking to develop his understanding of himself and his world, it will be useful to consider the experience of someone who was cut off from the world of man by the crushing weight of the combined deficits of deafness and blindness. Speaking of her "two-fold solitude," Helen Keller described her release from the "invisible hands" which held her as follows:

> As the cool stream gushed over one hand she spelled into the other the word <u>water</u>, first slowly, then rapidly. I stood still, my whole attention fixed upon the motions of her fingers. Suddenly I felt a misty consciousness as of something forgotten--a thrill of returning thought; and somehow the mystery of language was revealed to me. . . . That word awakened my soul, gave it light, hope, joy, and set it free![309]

And further, speaking of her ability to participate so effectively in the full character of human life, she declared:

> It seems to me that there is in each of us a capacity to comprehend the impressions and emotions which have been experienced by mankind from the beginning. Each individual has a subconscious memory of the green earth and

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[309]Helen Keller, <u>The Story of My Life</u> (New York: Dell Publishing Co., 1969), p. 34.

> murmuring waters, a blindness and deafness cannot rob him of this gift from past generations. This inherited capacity is a sort of sixth sense--a soul-sense which sees, hears, feels, all in one.[310]

To this we would add that the "soul-sense" of which Ms. Keller speaks need not be restricted to the "gift from past generations" and is, in fact, not simply an effect in relation to its past but also a cause in relation to its future.

In the terms of our earlier discussion, we can say that the basis of our primary consciousness is a large generality that includes sensory information as but one aspect; it is an aspect that interfaces with consciousness precisely because the character of sensory data provides open boundary conditions which can come under the control of a higher-order operating principle.

It is recognized that the above discussion is a description rather than an explanation of the character of conscious processes; however, it is also clear that such descriptions are more nearly free from the debilitating conflicts between epistemological analysis and metaphysical beliefs which were the hallmark of interpretations deriving from the sensory oriented materialistic framework of traditional scientific psychology.

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[310] Ibid., p. 108.

6.3 PURPOSE AND MODERN PHYSICAL THOUGHT

In demonstrating the connection between the type of purposive issues we are interested in and the character of modern physical thought, it will be helpful to establish its plausibility by first comparing the classical view of the physical world with the view of modern physics.

Up to this point, Whitehead's treatment of the character and development of the era of modern science has been used almost exclusively because his is the only such analysis that is also a part of a larger interpretative schema which is capable of generating direct implications for psychology and education. Other authors have developed independent accounts of the same era which harmonize with Whitehead's analysis and also provide additional insights into the history of the transition to new foundations for modern science. In addition to the familiar works of Barbour[311] and Capek,[312] Harris[313] also provides an account of this transition which is very congenial to the approach taken by Whitehead. Speaking of the nature of physical

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[311]Barbour, Issues in Science and Religion, Chapter 10.

[312]Capek, The Philosophical Impact of Contemporary Physics, Part II, pp. 143-399.

[313]Errol Harris, The Foundations of Metaphysics in Science (New York: Humanities Press, 1965), Part I, pp. 37-159.

phenomona as they are known today Harris suggests that:

> . . . contemporary philosophy, to be in harmony with science, should expound a metaphysic holistic in type, and a logic of order, system and hierarchical structure. A pluralism devoid of any overarching principle of unity would be entirely out of keeping with scientific trends, and an atomistic logic of propositions independently true or false would be irrelevant to physics.[314]

With this type of orientation in mind as a goal of this discussion, we can briefly consider the summary characteristics of the old order.

6.3.1 THE OLD VIEW OF MATTER AND ITS REPLACEMENT

The metaphysical outlook of the classical physical sciences was essentially unchanged from the time of Galileo until the end of the nineteenth century. During that time the world was thought of as consisting of hard impenetrable particles which moved in space and time according to the immutable laws of nature. It was just as common to think of space and time as independent of each other as it was to believe in the "Laplacian Illusion" that knowing the complete state particles in the world at one point would make prediction of the future possible. The outstanding characteristics of this entire era are its naive realism and reductionism.[315] It was a primary belief that the true

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[314] Ibid., p. 158.

[315] Barbour, op. cit., p. 273.

reality of the world was picturable in the common sense ideas that apply directly to everyday life. Additionally the theoretical world machine which operated with individual parts (atoms) that were externally connected with each other easily created the apparent requirement to view the whole function of any system or its parts as being completely defined in terms of its component parts.

Capek calls this the corpuscular-kinetic view of nature and suggests that although the scientific veracity of the classical physical concepts has been completely discredited, we cannot turn our backs on its concepts for two important reasons. First, its pronouncements still remain valid for the macroscopic three dimensional world of our daily lives, which is part of the reason why we still teach these concepts in our schools; and second, the standard habits of thought in the classical view are so ingrained in our culture that they form a part of the very fabric of common sense. These hidden habits of classical thought remain as an influence on our thinking, especially in the human sciences, and constitute a sort of "Newtonian-Euclidian subconscious" that requires the modern epistemologist to behave rather like a psychoanalyst in order to reveal the remnants of classical thought beneath the rhetoric of modern science.[316]

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[316] Capek, op. cit., p. xv.

Capek also makes the observation that the difference in meaning between the terms "classical picture" and "modern conception" of matter reveals an important difference between the two periods of scientific development. He feels that the long-standing and seemingly unquestioned reliance on visualization and pictorialization of scientific concepts was one of the most salient epistemological characteristics of the classical theories. In forming visualizations of their concepts, classical theorists used two main channels of input information namely, the visual and tactile senses. Tactile information was thought to reveal the impenetrability or solidity of matter by the sensations of contact and resistance and visual terms were viewed as the appropriate vehicle to express the mechanical properties of matter which were constructed out of our tactile sensations.

> The particles of matter were _imagined_ to possess a certain bulk, shape and position; their positions were _imagined_ to vary in time, or, in more ordinary language, the particles were _imagined_ to move through space.[317]

This view of the sensory character of classical science agrees well with our earlier discussions on the role and place of sensory experience in man's interpretation of the world about him.

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[317] _Ibid._, p. 5, Capek's emphasis.

In considering the character of the "modern conceptualizations" which have replaced the "classical pictures" of nature, we find complete corroboration for the Whiteheadian views which were incorporated as the interpretative basis of the earlier philosophical and psychological material. Capek believes that:

> Not a single component of this . . . [traditional corpuscular-kinetic] model of nature remained unaffected by the contemporary storm in physics.[318]

And Harris makes the highly restrained criticism that:

> Some biologists and psychologists also seem to lag behind in their awareness of the extent to which modern physics has cut away from their sciences the old materialist-mechanist conceptions of reality.[319]

In place of the old ideas of space, time, matter and energy, we now have one complex whole rather than an assortment of independent elements. The modern concern is with the total system of mutual interdependence. Space and time are not absolute pre-existent containers of matter in motion, but are instead part of an interdependent matrix of systems of interrelated activities. This revolution is largely due to the two basic reinterpretations that affected modern physics. On the one hand there was the challenge to the macroscopic views of classical physics which came from the advent of

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[318] Ibid., p. 361.

[319] Harris, op. cit., p. 37.

relativity physics, whose salient effect has been the unification and coalescence of the earlier discrete components into a systematic whole.[320] On the other hand, there was the development of modern quantum theory which created an entire new aspect of microphysics whose effect upon the old structure was no less shattering than had been the development of relativity. Matter could no longer be viewed as tiny bits of impenetrable stuff moving in space, but rather became a series of events in which the units (entities) are only resolvable into subordinate chains of activity--probability--waves became more fundamental units than the old planetary atom.[321]

> . . . the physical world has been revealed as a single, continuous whole of interconnected parts, distinguishable but interdependent both for their existence and for their character. It is not, however, a static whole--a mere pattern of differentiations--but a spatio-temporal process, a dynamic totality, or a flux of energetic activity, structured both in space and time.[322]

This statement underlines the repeated Whiteheadian assertions about the realities of the universe being actual entities whose main character is that of an event. Events occupy a certain minimum of space and a certain minimum of time and must be considered as to their internal and external

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[320] Ibid., p. 38.

[321] Barbour, op. cit., p. 279.

[322] Harris, op. cit., p. 142.

aspects. We can put the matter back into a complete Whiteheadian context with the following:

> For the modern view process, activity and change are the matter of fact. At an instant there is nothing. Each instant is only a way of grouping matters of fact. Thus since there are no instants, conceived as simple primary entities, there is no nature at an instant. Thus all interrelations of matters of fact involve transition in their essence. All realization involves implication in the creative advance.[323]

We can now turn from explicit consideration of the character of the dynamic, complexifying physical world which has given rise to progressively more complicated forms of organization to the consideration of the general philosophical implications which flow from the revised character of modern metaphysics.

6.3.2 PHILOSOPHICAL IMPLICATIONS OF MODERN PHYSICAL SCIENCE

Since this entire presentation can also be read as an investigation of the "philosophical implications" of modern physical theory, it is obviously unnecessary to attempt anything comprehensive here. Rather, the main intent is to consider narrower issues which are directly related to the hierarchical model of interrelated processes. The goal is to connect the findings of modern physical science with organismic metaphysics and thereby provide additional support for its continued usage.

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[323]Whitehead, Modes of Thought, p. 146.

One of the most fundamental corroborations supporting the philosophical usage of a hierarchical model comes from a predominant characteristic of physical theory that may be characterized as the recognition of the unity in the diversity of phenomena that man can investigate. While the concept of unity in diversity can be utilized in the description of all levels in a hierarchical structure, in the present context of physical theory we can assert a characterization of it that derives from the most fundamental characteristic of what we now know about the physical world of microcosmic elements.

In entering this discussion, it is also important to keep in mind that the hierarchical model does not inforce strict discontinuity between its various levels and that there are important ways in which all levels can be said to be similar. Whitehead phrased this thought, while at the same time reaching from the highest to the lowest level of the hierarchy, in the following way:

> The key notion from which construction [of a cosmology built in terms of our experience] should start is that the energetic activity considered in physics is the emotional intensity entertained in life.[324]

Perhaps, one can say that the primary emotion in the world of creation is the idea of love conceived as the power which binds together all things--the unifying power in the

[324] *Ibid.*, p. 168.

diversity of the world. The point here however, is not to define the character of this power but, instead to point to its existence and the fact that the interrelatedness we speak of that exists between all levels is not simply an arbitrary characteristic but is, in fact, an expression of the unity of all things.

There is a basic relationship between the logic of the hierarchy and the behavior of atomic phenomena. This relationship demonstrates a fundamental principle about the nature of a whole and its parts and is also one which completely obliterates any meaning that might still attach to the possibility of explaining a whole in terms of its parts, in other words, the old problem of reductionism. Barbour summarizes the extended argument provided by Margenau in a most useful way.[325]

Barbour is always appropriately cautious about extrapolating the explicit concepts of physics to other levels of reality and points out that in this case, the physical phenomena are indicative of a pattern that appears at other levels and therefore this similarity of pattern is worthy of comment. He has reference to the Pauli Exclusion Principle which is "a law concerning the total atom that cannot conceivably be derived from laws concerning individual

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[325]Barbour, op. cit., 294-298. Margenau's work is The Nature of Physical Reality, Chapter XX.

electrons."[326] This principle asserts that no two electrons in an atom can have exactly the same quantum states; quantum states take account of the electrons' energy, angular momentum, orientation and spin. This means that a new electron which enters a molecule is apparently influenced by the presence of those already present so that its state will indeed be unique; that is, some possible states are excluded. The influence on the electron is only apparent because quantum theory is explicitly different than the old mechanistic reasoning of classical physics. Barbour uses Margenau's statements on the requirement of modern physical theory to analyze the system of things as a whole as follows:

> The essence of mechanistic reasoning is seen to cluster around two beliefs: first that entities are divisible into parts, and second that these parts are localizable in space and time. . . . Prior to [the exclusion principle], all theories had affected the individual nature of the so-called "parts"; the new principle regulated their social behavior. With respect to a single particle it has nothing to say. . . . It is as though here, for the first time, physics had discovered within its own precincts a purely social law, a law that is simple in its basic formulation and yet immense in its collective effects. Mechanistic reasoning, already far behind, has gone out of sight as a result of this latest advance. . . . In the Pauli principle is a way of understanding why entities show in their togetherness laws of behavior different from the laws which govern them in isolation. . . . The emergence of new properties on composition is

326 Ibid., p. 295.

> a rather general phenomenon in modern physics and owes its occurrence to the exclusion principle.[327]

Important in this context is the fact that this physical theory establishes something of a "social" law even at the level of atomic events, thus even modern physics is constrained to consider the organic nature of an organized system as a whole. In this way too, matter and energy and space and time are indissolubly united. The similarity to the more general treatment of hierarchical logic which is found in Polanyi's work also constitutes an important aspect of the present discussion. Polanyi's position on the general nature of hierarchical logic is clear enough:

> The higher principles which characterize a comprehensive entity cannot be defined in terms of the laws that apply to its parts in themselves.[328]

And, in a less abstract way, he is willing to assert that what seems to be logically true of hierarchies is also true of the reality of things--an assertion that seems well anchored in reality by the Pauli Principle. Of the evolutionary progression toward increased complexity and intellectual capacity in living things, he maintains:

> We can recognize then a strictly defined progression, rising from the inanimate level to

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[327]Margenau, The Nature of Physical Reality, pp. 442, 444 quoted in Barbour, Ibid., p. 296, Margenau's emphasis.

[328]Polanyi, The Structure of Consciousness in Knowing and Being, Marjorie Grene, ed., p. 217.

ever higher <u>additional</u> principles of life.[329] This, of course, is a reiteration of a basic theme in the earlier discussion of stratified structure (hierarchy).[330] It also serves to underline the fact that wholeness, unity and organic structure are as much a part of reality as the older views of plurality, individuality and diversity. Atomistic, independent facts have now been replaced by a logic which stresses the necessity of organic unity and the necessity of recognizing the internal relations which are appropriate to each level of reality.

Thus far in our consideration of specific philosophical implications of modern physical theory we have focused primarily upon the new type of <u>unity</u> which is implied by the hierarchical view and elements of quantum theory; equally important in this regard is the associated emphasis which is placed on <u>activity</u> and <u>creativity</u> in nature. This aspect is demonstrated by the development of novel forms of organization which have become the elaborate hierarchy of the evolving cosmos. On this aspect of what is already a familiar topic, we can add to the development of the previous material by considering an analogy which is developed by Capek in his treatment of the search for new ways of

[329] Ibid., p. 234, emphasis added.

[330] Cf., Section 6.2.1 above.

understanding the implications of modern physics.[331]

Starting with Whitehead's observation that:

> the texture of observed experience, [illustrates a] philosophical scheme, . . . such that all related experience must exhibit the same texture.[332]

Capek develops the idea that the past fascination of scientists and philosophers with the information they derived about reality from visual and tactile stimulation has caused them to emphasize the constancy of matter and the unchanging nature of space at the expense of appreciating the truly dynamic nature of things. By way of correcting this deficit, Capek suggests that auditory sensations provide an important clue which is obscured by the other modes of sensory knowledge. To make the contrast vivid, he points out that arithmetical units are like the indivisible atoms of the old view. That is, they can be grouped together but such grouping does not affect their nature in any way. The relationship is entirely external to the meaning of the unit. Thus, "the relation of arithmetical units to their sum total is the same as the relation of <u>the parts to the whole in space</u> [classical space, that is]."[333]

The importance of the shift in sensory modality becomes

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[331] Capek, <u>op</u>. <u>cit</u>., Chapter XVIII.

[332] Whitehead, <u>Process and Reality</u>, p. 5, quoted in <u>Ibid</u>., p. 370.

[333] <u>Ibid</u>., p. 371.

clear when he develops the analogy by considering the experience of listening to a piece of music.

> The musical phrase is a <u>successive differentiated whole</u> which remains a whole in spite of its successive character and which remains differentiated in spite of its dynamic wholeness. Like every dynamic whole it exhibits a synthesis of unity and multiplicity, of continuity and discontinuity; but it is not the unity of an undifferentiated simultaneous whole nor is it the plurality of juxtaposed units; it is neither continuity in the mathematical sense of infinite divisibility nor is it the discontinuity of rigid atomic blocs. For this reason, paradoxical as it may sound, the traditional distinction between succession and duration must be given up.[334]

Thus, Capek sees a parallel between musical wholes and the physical phenomena of modern science which makes for much greater intuitive clarity in our apprehension of the character of becoming. He summarizes the main qualities offered by auditory models as follows: first, they stress the incompleteness of becoming and its pulsational character; second, they provide for the emergence of novelty within the causal influence of the past; third, individual events are retained in the continuity of the flux; fourth, they demonstrate the futility of attempting to take instantaneous cuts of the whole while retaining its meaning; fifth, what before could only be interpreted as contemporaneous, isolated things can now be thought of as the co-becoming of

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[334] <u>Ibid</u>., pp. 371-372, Capek's emphasis.

related events.[335]

The parallel of this sort of "imageless dynamic model" to both the hierarchical interpretation and Whitehead's organismic position is obvious in the following.

> Thus in the organic theory, a pattern need not endure in undifferentiated sameness through time. The pattern may be essentially one of aesthetic contrasts requiring a lapse of time for its unfolding. A tune is an example of such a pattern. Thus the endurance of the pattern now means the reiteration of its succession of contrasts. This is obviously the most general notion of endurance on the organic theory, and "reiteration" is perhaps the word which expresses it with most directness. But when we translate this notion into the abstractions of physics, it at once becomes the technical notion of "vibration." This vibration is not the vibratory locomotion: it is the vibration of organic deformation.[336]

Clearly, the argument has again converged upon the central themes of a) unity in diversity, as represented by the fact that the hierarchical interpretation can span levels ranging from the realization of "aesthetic contrasts" to the "vibration of organic deformation" at the molecular level and b) the dynamic and creative as represented by the fact that patterns endure but not necessarily in "undifferentiated sameness through time."

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[335]Ibid., p. 378.

[336]Whitehead, Science and the Modern World, quoted in Ibid., p. 375.

6.3.3 CONCLUSIONS REGARDING PURPOSE AND PHYSICAL THOUGHT

The destruction of the old materialistic, mechanistic, and deterministic views of classical physics also amounted to a destruction of the basis for substance philosophy. In their place, there is emphasis upon chains of events and a hierarchically structured universe. It is however, of vital importance that we do not repeat the modern version of past reductionist thought. It is erroneous to assume that the content of the new physics applies directly to human experience and to education. A protection against reductionist theorizing is afforded by the hierarchical model in that its purposive and organismic interpretation of reality is also open-ended in the sense that it places man at the pinnacle and therefore invites meaningful comparison with issues of human free-will and the spiritual nature of man. Of this condition Barbour writes:

> Atomic indeterminacy and human freedom are not . . . directly related to each other, and occur on very different levels. They are both examples of "weak causality" in which a set of potentialities is determined. . . . Individual events display some unpredictability, whereas exact laws are the result of large numbers. Insofar as man is a collection of particles, atomic indeterminacy is lost in statistical regularities. But insofar as human experience is an integrated event, it displays a new type of unpredictability--not derivative from atomic indeterminacy, but from its organization at a higher level. Perhaps coordinated individual events, at various levels, have multiple potentialities,

> though only at higher levels is there freedom.[337]

Thus, even though we can derive a meaningful corroboration of the model from physics, physics is and always will remain based upon a very limited set of phenomena and the suggestive implications of its ideas will always require correlation with other sciences and ultimately with the data of human experience. Physics can never be the basic source of definition for the whole of concrete reality.

Further exploration of the relation between human freedom and the character of the hierarchical model will be considered in later sections here, in relation to the implications of physical thought for the problem of organic purpose, we should observe that the physical world which spawned the now defunct concepts of classical physics is still the same old world that seemed to function according to that type of causal concept and law. It is also true that within the old limits of understanding those old laws are still valid. They work because the abstractions involved "explained" the everyday three dimensional world that was assumed to be concrete reality. That we have come to the more complete modern understanding of both the character of the physical world and the possibilities involved in human freedom is itself the result of the continuing

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[337] Barbour, op. cit., p. 314, Barbour's emphasis.

evolution of the purposive cosmos. Man has not only deepened his understanding of the nature of the levels which lie below him but has also heightened his awareness of the possibilities of seeking his true nature in that which lies ahead and is transcendent in relation to his present position.

6.4 PURPOSE AND MODERN BIOLOGICAL THOUGHT

We can now seek to match our organismic, unified and dynamic view of the nature of physical processes with a compatible explanation of the nature and mechanisms of biological evolution.

In opening this subject, it is hard to circumvent appreciating its historical aspects since it is obvious that the theory of evolution which was widely popularized by Darwin is one which grew up in the materialistic era of scientific thought. It therefore naturally assimilated the idea of a completely lawful universe. Evolution was thought to be a process equally as absolute, universal and deterministic as the orderly behavior of a chemical reaction.[338] But the view was not without rival for in much the same fashion as we have observed in the growth of psychological thought, there were those who departed significantly from this thesis. To go back into history a little, we find

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[338] George G. Simpson, This View of Life (New York: Harcourt, Brace and World, Inc., 1964), p. 177.

that an important name among those who dissented was that of Jean Baptiste Lamarck who, in 1809, published a complete theory of evolution. This theory was an outgrowth of the eighteenth century version of the Aristotelian hierarchical view that the world consisted of a Great Chain of Beings who were arranged in increasing complexity from inert molecules, to living molecules, to microscopic animals, etc., until finally man is reached. The philosopher J. B. Robinet affirmed that:

> The Scale of Beings constitutes a whole infinitely graduated, with no real lines of separation. . . . This great and important truth, the key to the universal system, and the basis of all true philosophy, will day by day become more evident, as we progress in the study of Nature.[339]

Following this quotation, Lovejoy points out that a dominant approach to the topic of evolution was to divide the "different orders which constitute the scale of being into four general classes: 1) inorganic, 2) organic but inanimate (i.e., plants), 3) organic and animate, but without reason, 4) organic, animate and rational."[340] The principle of continuity of being had important philosophical consequences because it seemed to demand that all beings should have some degree of any quality which is possessed by anything. Thus,

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[339] J. B. Robinet, De la Nature, quoted in Lovejoy, The Great Chain of Being, p. 275.

[340] Ibid., p. 275, emphasis added.

we find Robinet expressing sentiments that have a certain familiarity with a major theme of the organismic philosophy of Whitehead.

> For myself I would rather give even intelligence to the least atom of matter--provided it were in a degree and of a quality suitable to it--than refuse organization to the fossils and make them isolated beings, having no connection with others. It is to no purpose to tell me that this is a bizarre opinion, and that it is not possible that a stone thinks. I should deem it a sufficient reply to say that I am not responsible for consequences correctly deduced, . . . if the law of continuity is admitted, we ought likewise to admit all that follows from it; . . . it is inexcusable to abandon so general a principle without a sufficient reason.[341]

Thus, while there are important similarities to modern organismic thought, the fact that it was based on a deductive conclusion from an abstract logical principle renders the view incompatible with scientific thought. One of the things which Lamarck added to this approach was the attempt to establish a mechanism by which such a chain of being could be produced. Lamarck's solution was to add to the continuity interpretation of evolution the ability of organisms to make habitual adaptations to their environment. He further believed that it was from such adaptations that structural changes would result in the animal owing to the use or disuse of various organs and that these changes

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[341]Robinet, in Ibid., p. 277.

would be immediately inherited by subsequent generations.[342]

Lamarck's theory, though popular at the time, did not survive because of two main faults; first, he was in trouble with the upholders of the biblical account of creation as any early evolutionist would be; and second, the fact that he put so much stress on the upward striving of organisms to increase their complexity made his argument sound entirely too teleological to those who were seeking scientific explanation. Therefore, when Darwin published his Origin of Species in 1859 (fifty years after Lamarck), in which he explained evolution in terms of mechanical principles that did not rely on any sort of outside reference, he met with the instant and lasting approval of the scientific community. The reaction of the religious community aside from being well known, is also of little interest in this context.

It would be counterproductive to pursue a strict historical treatment of the rise of evolutionary theory here. Our purposes will be better served by focusing on specific topics that have bearing on the modern scientific interpretation of evolution and the relation of those issues to modern psychology. In relating evolutionary thought to psychology, there are two general observations that should

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[342] Simpson, The Meaning of Evolution (New Haven: Yale University Press, 1949), pp. 266-267.

be made. First, the type of psychology that reached its new maturity in the latter half of the nineteenth century in Germany (and this includes both psychology as a natural science and psychology as a human science), was primarily oriented toward the study of adult intelligence and did not concern itself with any investigation of the development of children into adults. Of this condition Lowry colorfully remarks:

> Nor was it merely accidental that this was so, for, however great its scientific enthusiasm, the "new" German psychology was guided throughout by two assumptions that were hoary with age and questionable at best: the first, that psychological processes find their clearest expression in the "human, normal, adult mind"; the second, that all such processes may be referred back to sensations and their vicissitudes in perception and thinking.[343]

There was practically no direct influence of the Darwinian evolutionary view upon the nineteenth century birth and adolescence of psychological theory. This condition is a direct outgrowth of the empirical psychology and philosophy of earlier times and also the fact that the science of physiology provided a direct link with the physical world through which man's operation could apparently be understood.

A second important characteristic of evolutionary theory in psychology is that it provided the concepts with

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[343]Lowry, The Evolution of Psychological Theory, p. 111.

which to correct the above condition. Once it was reasonably held that man's past was somehow immanent within him and that the evolutionary ancestry of man might be therefore available for study, the goal of psychological inquiry became more than the study of the adult human mind. Theorists now had just cause to pursue such studies as "developmental psychology" and "comparative psychology." In this way, psychology received a great redirection into many and diverse areas of investigation.

6.4.1 STANDARD EVOLUTIONARY THEORY

Today, it is commonly accepted that the Darwinian view of evolution can be summarized as follows:

> What do we mean by twentieth-century Darwinism and what do we mean by the synthetic theory of evolution? I think its essence can be characterized by two postulates: 1) that all events that lead to the production of new genotypes, such as mutation, recombination and fertilization are essentially random and not in any way whatsoever finalistic, and 2) that the order in the organic world, manifested in the numerous adaptations of organisms to the physical and biotic environment, is due to the ordering effect of natural selection.[344]

This position with regard to the total efficacy of random variation and natural selection is, of course, precisely the same interpretation which was considered earlier in

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[344]Ernst Mayr, quoted in C. H. Waddington, <u>The Nature of Life</u> (New York: Atheneum, 1962), p. 85.

connection with the general problem of purpose.[345] At that time this doctrine was criticized from the perspective which was generated by the contrast between entropy and life. In the present context, we can continue the search for expanded meaning in the concept of purpose by considering some of the alternatives which are offered by modern biologists.

Of those who stress that chance variation and natural selection are necessary but not sufficient elements in explaining the evolutionary processes are G. G. Simpson,[346] a paleontologist, and C. H. Waddington,[347] a biologist. Essentially, their approach is one that stresses the complex interactions between a population and its environment; these are interactions which also occupy extended periods of time. It is from the intermixture of these factors that evolutionary processes are believed to produce a certain amount of directedness, creativity or quasi-purposiveness which acts to balance out the effects of pure randomness.

In speaking of the insufficiency of random mutation and natural selection, Waddington uses an interesting phrase that we have seen in quite another context:

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[345] Cf., Section 6.0 above.

[346] Simpson, <u>This View of Life</u>, pp. 63-84.

[347] Waddington, <u>The Nature of Life</u>, pp. 72-98 and <u>The Ethical Animal</u> (Chicago: The University of Chicago Press, 1960), pp. 84-100.

> In my opinion, biology has already made all the discoveries of matters of principle which can be reached by this way of formulating the situation. The time seems to have come when we need to take account of two further aspects of the evolutionary mechanism.[348]

The phrase, "The time seems to have come" is interesting for two reasons. First, Waddington is asserting the need to modify a long-standing tradition and therefore is definitely in a heightened condition of using his own creativity and beliefs as a primary basis from which to maintain that change is necessary. We have, therefore, an example of the type of theory formulation that was the chief topic of the earlier discussion of the character of scientific thought. Second, this is the exact phrase that was used by J. B. Watson when he launched behavioral psychology. The main effect of Watson's dictum was to read consciousness entirely out of the picture of scientific psychology; the main effect of Waddington's thought is going to be to begin to reassert the role of other than material factors in the behavior of animals.

Waddington's two additional aspects of the evolutionary mechanism are: 1) the epigenetic system and 2) the exploitative system. Thus, Waddington postulates a four-factor evolutionary system as follows:

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[348] Waddington, The Ethical Animal, p. 89, emphasis added.

> 1) a genetic system, which engenders new variation by the process of mutation and transmits it by chromosomal genes; 2) an epigenetic system, which translates the information in the fertilized egg and that which impinges on it from the environment into the characters of the reproducing adult; 3) an exploitative system by which an animal chooses and modifies the environment to which it will submit itself; and 4) a system of natural selective pressures, originating from the environment and operating on the combined result of the three other systems.[349]

Both of the aspects which Waddington is proposing are seen to operate in between the role of the two traditional factors of evolutionary theory. In other words, they refer to the endogenous factors or the within of things as opposed to the strict external interpretation of traditional theory.

Of the epigenetic system, Waddington observes that the pressures of the environment do not operate on the genetic material itself but instead operate on the organisms as they develop from fertilized eggs into reproductive adults. Assigning indices of selective value to individual genes is, he points out, only a convenient mathematical shorthand which ignores the reality of the developing individual. He and others have performed experiments which demonstrate that the epigenetic system is one which coordinates the isolated notions of acquired and inherited characteristics into the combined notion that "In reality all characteristics are both acquired and inherited." Of this mechanism

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[349] Ibid., pp. 94-96.

which he refers to as "genetic assimilation" of an acquired character, he says:

> Although this mechanism is quite different from the Lamarckian inheritance of acquired characters, being entirely based on the concepts of orthodox Mendelian genetics, it can in fact play in evolutionary theory the very role for which Lamarckian hypotheses have often been invoked.[350]

Thus, after more than one hundred and fifty years, we have a scientifically acceptable version of a form of teleological behavior. The importance of this formulation and the need for it is demonstrated by Jean Piaget's ready usage for the concept as a very suggestive analogy in the construction of his psychological theory:

> Waddington has suggested the name "chreods" (necessary routes) to describe developments particular to an organ or a part of an embryo, and he applies the term epigenetic system (or, epigenetic "scene") to the sum of the chreods, taken as being--to a greater or a lesser degree--channeled. . . . It is . . . a new concept of equilibrium as something which is, as it were, kinematic, and which, in determining such processes, is nevertheless quite distinct from homeostasis: there is a kind of "homeorhesis" (guidance) when the formatory process, deviating from its course under outside influence, is brought back on course by the interplay of coercive compensations.[351]

And now, with the additional terms of "chreod" and "homeorhesis" which Piaget has taken over as a way of describing

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[350] Ibid., p. 94.

[351] Piaget, Biology and Knowledge, p. 19.

the over-all epigenetic process, the analogy with mental functioning can be fully developed:

> In the cognitive field, chreods can indeed be singled out which are more or less independent, each with its own homeorhesis, and forms of final equilibrium (in the sense that they continue to exist in stable condition while still being capable of eventual integration into wider fields of equilibrium) which might be the cognitive equivalent of homeostasis.[352]

In addition to the obvious applicability of the epigenetic concept to psychology, there is a basic similarity between Piaget's idea that a "stabilized" homeorhetic equilibrium is the basis for "eventual integration into wider fields of equilibrium" and the hierarchical logic of boundary conditions which Polanyi advances as a generalized schema for understanding the relationships between successive layers of operating principles.

The reconsideration of biological evolution which is offered by Waddington and adopted by Piaget as a meaningful way of describing cognitive evolution, as well as biological evolution, is, by its very nature, a criticism of mechanical causality on the one hand and traditional empirical philosophy on the other. Both Piaget and Waddington recognize this point and speak to it directly. Waddington for his part, takes Whitehead as a major guide toward reworking concepts in embryology and genetics and Piaget, though he

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[352]<u>Ibid.</u>, p. 25.

does not mention Whitehead for anything other than his early work in mathematics, and then only to point up the fact that mathematics has progressed since Whitehead published in that field in 1911, has been guided by the productiveness and cogency of his years of research into the problem of genetic epistemology to appreciate the importance of the view which was inspired by Whitehead and developed in biology by Waddington.

As would be expected therefore, we find that Piaget devotes a lengthy discussion in his Biology and Knowledge[353] to the issues of evolution taken in the Aristotelian sense of final causality, the idea of vitalism in biology, the formulations of Descartes, the problems of empiricism and Lamarckism, and the philosophy and psychology of associationism. In short, he touches on many of the major perplexities that have been considered in earlier chapters. No attempt will be made here to reproduce Piaget's argument for the validity of the over-all position taken by Waddington. He says in summary,

> It took a great embryologist turned geneticist, like Waddington, to make clear, at last, how out of the question it is to explain evolutive variation simply in terms of preformation or chance. . . . As soon as it is recognized that . . . the environment is just as much organized by the organism as phenotypic variation is directed by the environment, then

[353] Piaget, Biology and Knowledge, Chapter III, pp. 70-137.

> it becomes possible to speak of the "cybernetic circuits" . . . and development can be seen as a series of organizational ladders, all different and all perpetually subject to cyclic causality.[354]

What is important in this context is that Piaget analyzes the new position on evolutionary development in terms of the insights provided by cybernetic models and develops his version of the over-all life force in the following way:

> [With cybernetics], we can today retain all that is positive in the idea of finality but at the same time replace the notion of "final cause" by an intelligible feedback causality.[355]

Once again, we can point to the similarity of Piaget's "series of organizational ladders" and Polanyi's generalized hierarchical logic and also to the fact that Piaget readily recognizes the idea of process in which the environment is as much organized by the organism as the organism is directed by the environment. What is most significant here however, is the fact that there is no attempt to generalize the insights derived from this study as is found in Whitehead. This seems natural because Piaget is a psychologist interested in circumscribed issues while Whitehead had a philosopher's view of the cosmos. This very fact points up the all-important role which is played by the over-all orientation of the theorist. Since Piaget is concerned to

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[354] Ibid., p. 135, emphasis added.

[355] Ibid., p. 132.

explain the mechanisms of cognitive development and to make as much sense out of the relation between biological and cognitive development processes as possible, he is satisfied to accept a limited view of teleological processes which develops by analogy with cybernetic circuits. From this, he gets the concept of "cyclic causality" as a replacement for "final causality." The problem with this approach is that it fails to answer the main part of the central question with which evolutionary views must deal; namely: "Why has the trend of evolution been upwards?" Giving various levels of a hierarchical organization the prerogative of "cyclic causality" may improve our immediate scientific understanding of specific problems but it does little to straighten out the over-all problem of the directionality that exists as a result of the fact that life has indeed arisen toward higher levels of attainment.

Piaget's work puts a challenge to the philosophical position we have taken with respect to Whitehead's organismic process explanation of reality. The challenge is this: With the advent of the modern position on evolutionary theory and the development of cybernetic theory, scientists like Piaget can meaningly compare life processes (biological and cognitive) to the behavior of goal-seeking machines. The task then, is to decide if such orientations to the problem yield a satisfactory solution to the problem of purpose as it is manifest in evolution, as it exists in the theories of scientific psychology, as we experience it in our lives, and as it is manifest in the children we hope to educate in schools. Our eventual answer to this question will be that such explanations are insufficient to answer these larger questions. The precise reasons for this conclusion will be considered presently after a few additional considerations relating to the standard accounts of evolutionary theory are introduced.

Before we go on however, we should note that Piaget himself does not believe that his formulation is the ultimate answer, but only that it is the most scientific one at present. Thus, he says, near the final page of his Biology and Knowledge that:

> It is to be hoped that biologists and psychologists will collaborate in future, so that together they may uncover the secrets of the organizing organization, once they have discovered those of the already organized organization.[356]

Clearly, since one must have some belief as to the nature of the organizing organization before he can tackle the problem of the organized organization, we must at some point address that larger issue in a scientific as well as philosophical way.

In the expanded version of evolutionary theory the role

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[356] Ibid., p. 348.

of process, the action within the organism, has been stressed as an important determinant of the processes of evolution; lacking, for the present, an appreciation of a larger framework into which to fit the activity which exists at various explanatory levels, the idea of causation has been likened to cybernetic machines. This approach is appealing to scientists because it provides a reasonable mechanism by which an important problem can be understood. Simpson demonstrates this by analogy to the age-old problem of the chicken and the egg.[357] Naturalists, he says, have always been more interested in hens whereas, geneticists are partial to eggs. Hen-evolutionists, e.g., Darwin and the Neo-Lamarckians and the Neo-Darwinists, were primarily concerned with the hen and her ability to survive the rigors of the environment. Egg-evolutionists focused on the processes of reproduction and the importance of events in cells during critical periods in the reproductive process. Simpson's solution, and that of many biologists, has been to point out that either view is incorrect when taken by itself. There is, in fact, a hen-evolution and an egg-evolution which are synthesized in the modern view. In other words, it is recognized that what happens to the chicken and to the populations of chickens sooner or later will affect the eggs and, obviously, what happens to the

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[357] Simpson, This View of Life, pp. 64-65.

eggs affects the chickens.

When it comes to explaining the selective processes that operate to counter the random mutations in genetic material some biologists, Simpson being one of them, hold that:

> It has been demonstrated both theoretically and experimentally that selection acts in a positive way tending to increase . . . the chances not only of favorable genes but also of favorable hereditary combinations.[358]

Other biologists, Waddington and that part of Jean Piaget which he still considers to be a scientific biologist, stress the role of mentality and internal states in the creation of adaptive behavior. Here, novel behavior and opportunistic reactions on the part of an organism are seen to indirectly give rise to acquired characteristics. It is therefore a mechanism that "exactly mimics inheritance of an acquired character, but one which depends not on the direct induction of a hereditary variation, in the manner suggested by Lamarck, but on selection operating on the genetical structure of the population.[359]

The following statement of Waddington is a fitting summary of the popular biological view of evolution and one which also puts the central problem squarely before us:

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[358] Ibid., p. 209.

[359] Waddington, The Ethical Animal, pp. 92-93.

> It remains true to say that we know of no other way than random mutation by which new hereditary variation comes into being, nor any process other than natural selection by which the hereditary constitution of a population changes from one generation to the next. But if one confines oneself to the remark that the basic processes of evolution are not finalistic, this, while true, can no longer be regarded as adequate. The non-finalistic mechanisms interact with each other in such a way that they form a mechanism which has some quasi-finalistic properties, akin to those of a target-following gunsight.[360]

Here, of course, is the problem of purpose in man and the biologists' assertion that human purpose is similar to a "target-following gunsight." The concept of human purpose we are seeking sees man not as a "projectile" of the evolutionary process but, rather, as a self-guiding missile that is aiming at a destiny entirely out of range of any target a cybernetic gunsight might select for him.

6.4.2 PURPOSE AS A MECHANISM OF BIOLOGICAL EVOLUTION

Sir Julian Huxley says, near the beginning of his Evolution in Action, that in comparison with the immensity of the inorganic sector, i.e., the whole of space, those bits of matter that are assembled into the galaxies and stars show only the simplest of organization and of which he believes:

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[360]Waddington, The Nature of Life, p. 98.

> Nowhere in all its vast extent is there any trace of purpose, or even of prospective significance. It is impelled from behind by blind physical forces, a gigantic and chaotic jazz dance of particles and radiations in which the only over-all tendency we have so far been able to detect is that summarized in the Second Law of Thermodynamics--the tendency to run down.[361]

Against this meaningless inorganic universe he projects two other layers of meaning or increasing complexity--the organic or biological and the human or psycho-social. Of these two segments he feels that evolutionary transformation is strictly a result of natural selection; however, he admits a fundamental difference between them:

> Evolution in the biological phase is still impelled from behind; but the process is now structured so as to be directed forward.[362]

In considering development in the human sector, he finds that due to the ability of humans to combine accumulated experience with conscious purpose,

> the main unit of evolution in the human phase is not the biological species, but the stream of culture, and genetic advance has taken a back seat as compared with changes in the transmissible techniques of cultural advance.[363]

and of the idea of purpose in relation to this human phase, he asserts:

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[361]Julian Huxley, Evolution in Action (New York: The New American Library, 1957), pp. 11-12.

[362]*Ibid.*, p. 13.

[363]*Ibid.*, p. 14.

> In a way most important, purpose has now entered the process of transformation itself; both the mechanisms of psycho-social evolution and its products have a truly purposeful component, and evolution in this sector is pulled on consciously from in front as well as being impelled from behind.[364]

The key thing about Huxley's position is that the purposiveness he is willing to grant to human evolution is still basically a trial-and-error affair in which that which exists today is simply the result of the accretion of a certain configuration out of the numberless opportunities which have occurred in the billions of years of which man is aware.

Evolution is viewed as pseudo-purposive since, as Simpson so clearly states,

> Man is one of the millions of results of this material process. . . .
>
> He is by far the most adaptable of all organisms because he has developed culture as a biological adaptation. . . .
>
> A world in which man must rely on himself, in which he is not the darling of the gods but only another, albeit extraordinary, aspect of nature, is by no means congenial to the immature or the wishful thinkers. . . .
>
> It is possible that some children are made happy by a belief in Santa Claus, but adults should prefer to live in a world of reality and reason. . . .
>
> It is a characteristic of this world to which Darwin opened the door that unless _most_ of us do enter it and live maturely and rationally in it, the future of mankind is dim, indeed--if there is any future.[365]

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[364] _Ibid._

[365] Simpson, _This View of Life_, pp. 24-25.

Simpson's comments are useful because, as the expressions of a modern and respected biologist, they are an important corroboration of the basic philosophical issues that have plagued the modern era. Later on he says:

> Adaptation by natural selection as a creative process . . . [is] the answer of the synthetic evolution to the problem of plan and purpose in nature. . . . This natural process achieves the aspect of purpose without the intervention of a purposer, and it has produced a vast plan without the concurrent action of a planner. It may be that the initiation of the process and the physical laws under which it functions had a Purposer and that this mechanistic way of achieving a plan is the instrument of a Planner--of this still deeper problem, the scientist as scientist, cannot speak.[366]

There can be no clearer exposition of the basic problems of the entire modern era. Simpson says it all. God really _is_ the great mechanical inventor that the thinkers of the seventeenth and eighteenth century came to understand, man really _is_ responsible to himself, for himself and by himself, existentialism _is_ correct and scientists _do_ feel that they can be scientific without also having some sort of larger background of belief that animates their lives. As Whitehead says:

> Scientists animated by the purpose of proving that they are purposeless constitute an interesting subject for study.[367]

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[366] _Ibid._, p. 212.

[367] Whitehead, _The Function of Reason_, p. 16.

It also seems odd that it was possible to interpret many of the modern discoveries in the physical sciences along lines which fitted into the organismic metaphysical interpretation of Whitehead while there seems to be little room for such insights in the very science that is supposed to study the phenomena of life. In light of the above, it is reasonable to assert that the field of biology is in many important aspects bereft of an appreciation of either 1) the extent to which its views are a product of the materialist-mechanist era or 2) the extent to which modern physical sciences have undermined those old materialist-mechanist conceptions of reality.

Purpose, far from being simply an apparent process is, in fact, the most significant and central aspect of evolutionary processes. Among those few biologists who have been willing to admit this and to attempt to incorporate it in their scientific studies was Edmund Sinnott. Sinnott's biology is, in general, supportive of the type of outlook that was contained in the characterization of organismic psychology developed earlier.[368] In _Two Roads to Truth_[369] he maintained that both reason and spirit give valid knowledge of the universe and that the products of both areas of

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[368] Cf., Sections 5.3.1 and 5.3.2.

[369] Edmund W. Sinnott, _Two Roads to Truth_ (New York: Viking Press, 1953), p. 73.

human sensitivity should be incorporated into all fields of scientific activity. The serious divisions in the world today were, he felt, problems of understanding what man really is, whether

> Man's true nature [is that] . . . he is a child of God with an immortal soul and actually a part of the great spiritual power that rules all nature, or whether he is simply a clever brute, risen out of the primordial slime; a chemical mechanism that has evolved into a glorified calculating machine whose aspirations, seemingly so exalted, are nothing but motions among molecules, a puppet whose fate is no longer in his own hands.[370]

Sinnott clearly saw that the belief a person holds about himself is closely related to his concept of nature and his beliefs about God.

For Sinnott to profess such views was one thing, to give scientific meaning to them was quite another. His solution was to view mental life and the physical body as but two aspects of the same protoplasmic process. Protoplasmic goal-seeking was thought to provide a sufficient basis upon which to assert that there is a teleology implicit in every organism. The closest he seems to have come to being able to explain the idea of purpose is to see organic pattern as an:

> Organized system, maintained by the regulatory control of its activities, [this] implies the

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[370]Sinnott, Matter, Mind and Man (New York: Atheneum, 1968), pp. 18-19.

> presence within it of <u>something to which these activities tend to conform</u>, a norm, a standard, a goal or end, what the philosopher would call a <u>telos</u>, inherent in the whole living mass.[371]

The main problem with this type of approach, in spite of the provocative theme of the over-all proposal, is that it is clearly open to the following sort of well deserved criticism. Simpson says of Sinnott's earlier works, which sounded even more spiritualistic and vitalistic,

> The scientific problem was to explain biological regulation, and we have decided that its cause is the principle of organization. That is not enlightening! . . . I do not deny and in fact rather envy Sinnott's revelation, but it is a revelation private to him. With respect to . . . <u>biological</u> considerations, it is prejudice and not conclusion.[372]

We can conclude from this that this approach to the problem of purpose is really an effort to insert purpose into the basic explanations of biological phenomena at a point before the explicit metaphysical basis of the old theories has been clarified. The net result is that purpose will always seem to be an ad hoc concept (which it is in the old system) that has been imported into the discussion in an effort to explain something that did not need explaining in the first place.

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[371] <u>Ibid</u>., p. 35.

[372] Simpson, <u>This View of Life</u>, p. 223, Simpson's emphasis.

Another modern biologist who seems to have been more successful in treating the philosophical aspects of purpose and teleology is Sewall Wright. Wright's main contentions are not open to the same sort of criticism that the normal use of teleological concepts is because he argues that there is in fact a hierarchy of organisms in which there is no discontinuity and that therefore:

> If the non-living world is completely devoid of mind, and if, as it seems necessary to believe, there was a time when no life could exist, how did mind appear?[373]

Wright finds that the only solution is to assume that

> If the human mind is not to appear by magic; it must be a development from the mind of the egg and back of this, apparently, of the DNA molecules of the egg and sperm nuclei that constitute its heredity . . .

Therefore, he concludes:

> The only satisfactory solution of these dilemmas would seem to be that mind is universal, present not only in all organisms and in their cells but in molecules, atoms and elementary particles.[374]

The thing that protects Wright from a rather embarrassing repetition of the same sort of philosophical approach that we saw in the eighteenth century thinker Robinet, who,

> . . . would rather give intelligence to the

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[373] Sewall Wright, Philosophy of Biological Science in Process and Divinity, Reese and Freeman, eds. (LaSalle: Open Court, 1967), p. 113.

[374] *Ibid.*, p. 114.

> least atom of matter--provided it were in a degree and of a quality suitable to it . . .

is that Wright develops a hierarchical structure for the biological and physical sciences which allows him to appreciate the character of the operating principles of each level. Thus, if physical phenomena appear to be deterministic it is because of the lawful regularities that pertain at that level. Similarly, if freedom of the will appears to be meaningful at the human level, then it should be addressed freely without fear of having to deny its own nature because of the character of matter or of having to deny the realities of matter because of its own character. Wright believes:

> The task of science is not complete until it has followed phenomena through all levels of the hierarchy, up and down as far as possible, and after obtaining the best statistical description at each, has tied them all together.

Such a view is neither anthromorphic or mechanomorphic nor is it simply a hopeful philosophical outlook. Wright goes on to describe the utility and developed potential of such a view.

> In modern genetics, this has meant working down from the statistical rules at the level of the individual to those of chromosomes and genes and to the chemistry of these, and up again into the physiology of gene action at the level of cell, tissue, organ and individual, and finally to the properties of populations. All statements are ultimately in terms of probabilities but all are related.[375]

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[375] *Ibid.*, p. 123.

Here we can end our consideration of the problem of purpose and biological thought and summarize the main points of the argument before considering further aspects of the basic definition of purpose.

6.4.3 CONCLUSIONS REGARDING PURPOSE AND BIOLOGICAL THOUGHT

The work of Waddington and Piaget goes a long way toward establishing not only the reality of the internal factors which constitute an organism but also the fact that it is absolutely necessary to take these into account if one is to create a useful scientific description of biological phenomena. This realization which is now established as an important parameter in modern evolutionary theory is clearly a corroboration of those faint philosophically and mystically inspired urgings that came from an ever-growing line of scientists, philosophers and psychologists. For our purposes it can be seen as a partial fulfillment of the quest for increased realization of the <u>within</u> of things that we first saw in the Romantic Movement, that was evident in Fechner's complete psychophysics, that was the basis of Dilthey's descriptive psychology and that has ultimately culminated in the existentialist philosophy which focuses on the exclusive validity of internal experience. This is not an attempt to establish a clear-cut causal link between these various diverse events. Rather, it is a reassertion of the fact that the entirety of the development of modern science has been involved in an era which, though it has come to believe in the absoluteness and completeness of its scientific descriptions, is still an era in which the total necessary meaning for man's existence is not contained within the basic structure of its scientific world-view. That we have observed a sporadic outpouring of the human spirit, here and there along the way, is an indication of the fact that as a real element in the structure of reality, it had to be some place and in its own pragmatic way seems to have taken up whatever temporary quarters the doubting materialistic world was uncautious enough to leave "unexplained."

An important aspect of the present biological interpretation is that it admits only to a form of causality that can be mimicked by machines, i.e., cybernetic "cyclic causality." We have said that this is insufficient and will consider why this is so in the next section; here, it is important to underline the fact that this form of causality can be regarded as a reflection of the fact that modern physical science has disproven the validity of total physical determinism. Whether biological science came to this understanding on its own or whether it did it with the aid of physical discoveries is not important. The important thing is that biological science also recognizes the inadequacy of deterministic, materialistic metaphysics. The reason that the particular metaphysical problems that have been so prominent in earlier discussions of physical science have not been of prime concern in our treatment of biological thought is found in the fact that biology, like psychology, grew up, assimilating the major assumptions of the materialist era. Since these assumptions have formed the background of its thought, biology has largely only observed reflections of these basic issues in the foreground of its analysis.

It remains to be said that the most likely solution to the over-all problems with interpreting purpose from within a scientific biological context is to be found in the type of hierarchical view characteristic of Wright's interpretation of biological philosophy. Once again, we have found the hierarchical process model to be an important way in which explicit problems in an area of scientific investigation can be solved.

Here, as with the conclusions of physical science, biological principles should not be taken as the complete description of reality. However, we can take the modern biological interpretation of the limited cybernetic type of teleology as a clear indication of the need for scientific methods which are sensitive to the internal and external relations of phenomena and also of the need for a clearer appreciation of the character of purpose as it applies to the hierarchical view.

Now that the discussions of physical and biological sciences are behind us, it is clear that there is sufficient corroboration of the hierarchical view to successfully counter the old claims of reductionist science. We have yet, however, to see the problem of why the trend of evolution has been upwards in its own right as the central problem with which a complete science, philosophy and psychology of man must deal.

6.5 TYPES OF PURPOSIVE EXPLANATION

This section considers types of purposive explanation as they relate to the organizing perspective of the hierarchical process model of explanation.

As has been indicated in a number of ways in earlier discussions, the role of internal factors which are appropriate to each level of a hierarchy varies greatly in importance. The internal factors of inert substances are negligibly small while the personality and self-hood of humans demand the most sophisticated conceptualization of internal processes. Whitehead has, in fact, created an elaborate description of the entire operating range of the various levels of activity. Of central importance here, is the fact that it is not until the higher forms of organic life are reached that we find any appreciable amount of consciousness. Since this is the case, and because our over-all concern is with psychology and education, we can concentrate upon those levels which are closer to the top of the hierarchy.

In earlier discussions, there has often been a need to clarify the characteristics of purposive behavior as it applies to various levels of operating entities. Whether we have been talking about machines, evolving animals, emergent cognitive processes, or the spiritual aspects of human life the concept of purpose has had an important but rather undifferentiated involvement. Barbour has provided a cogent summary of four separate meanings of the concept of purpose that are directly applicable to the present discussion.[376] Specifically, he breaks the concept down into the categories of a) functional behavior, b) self-regulating behavior, c) goal-directed behavior and finally, d) purposive behavior. By taking each type in turn we can build an appreciation of the increasing importance of internal factors at ever higher levels of teleological functioning.

The first category of meaning which attaches to the concept of purpose is that of functional behavior. Entities such as organs of the body act to perform a vital role in the operation of the whole organism and are sometimes described as fulfilling a specific purpose, e.g., filtering blood, eliminating wastes, etc.. However, in such cases,

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[376]Barbour, op. cit., pp. 337-341.

where there is not a separate purposive entity but only one that fulfills a task which contributes toward the maintenance of the whole organism, the word function is a more appropriate description of the activity.

There are many possible uses of this style of teleological behavior. Recall that this was the dominant mode of explanation that was used by the first truly American school of psychology. As its name indicates, Functional Psychology was primarily concerned with the functions which were operating and the contribution they made to the total organism. It is in this school that the concept of "drive," especially in the early work of R. S. Woodworth, received a great deal of emphasis. It is here also that the great emphasis on physiological explanation of drive and need states became such important concepts in much American psychology. A primary reason for this was to avoid the criticism which came to those who attempted teleological explanations.

Functional explanations are important in many contexts because they permit a wide variety of complex and variable things to be conveniently summarized. We recognize that the functions of the heart, liver, and lungs, etc., are the same even though most of their explicit physical characteristics vary markedly from species to species. It is also possible to refer to functional aspects of animal behavior in this way. The almost endless variety of specific behavioral acts that comprise nesting, grooming or even escape behavior can be summarized and described in terms of the functions they perform with the result that regularities can be found and testable hypotheses can be formulated.

Functional behavior is then, an important category of teleological explanation. But, since there is no explicit reference to a specific goal, it is better thought of as a low-level explanation which simply recognizes functional characteristics.

A more powerful explanatory concept is found in the idea of self-regulating behavior. This is the style of explanation that has become popular in many areas of science because of its direct relation with the science of cybernetics. In terms of our interests, the fact that Jean Piaget makes such extensive use of the concept indicates its utility. In this case behavior can be called teleological because, by analogy to target-seeking gunsights and the like, it is possible to define some sort of end state which is not yet attained but which is the apparent goal of the behavior, and also to recognize the ability of a certain adaptiveness in reaching the goal which can compensate for changing conditions.

The key concept in such self-regulating cybernetic machines is the idea of a feedback mechanism. It is from this that Piaget gets his idea of cyclic causality since the function of feedback is to "cycle" information relating to the output of the system back to the input of the system so that its performance can be adjusted toward the desired end state.

The attractiveness of this view is obvious since it is a much more inclusive concept than simple functional behavior. Yet, it is still a machine-like concept with little intrinsic appeal as an important way to characterize human behavior.

The next category of goal-directed behavior comes closer to the kind of explanation that is needed for living things. There is however, a close relation between the ideas of self-regulating machine behavior and those of goal-directed behavior. An animal, like a cybernetic machine, may be seen to act to achieve a goal and also to exhibit the ability to cope with changing external conditions which would otherwise prevent its success. However, there is a main difference which forever prevents a total explanation of animal goal-seeking in terms of self-regulating cybernetic feedback. Animals do, in fact, find novel ways of achieving standard goals, e.g., the lions on game preserves in Africa that ride atop automobiles so that they can more easily pounce on unsuspecting prey. In addition, animals also anticipate future occurrences, even to the point of seeking objects, i.e., food, when there is none within sight or smell. Thus, while there are many important characteristics which are shared between the two styles of explanation, animal behavior is not exhaustively explained via the self-regulation of cybernetic machines.

In the final category of teleological behavior we have that which is called purposive behavior. The term purposive is reserved for cases where it is evident that higher-order operatives like beliefs, desires and intentions are functioning. It is this category which is obviously most applicable to man since the other modes of explanation do not produce a description of teleological behavior that compares with what we know to be true in our own life experience. It is only in man that the full consciousness which underlies this type of behavior is to be found.

Thus, while there are many similarities in the various styles of teleological explanation, the all-important differences which pertain to each mode are differences which are most easily understood in terms of the hierarchical status of the behavior in question.

The proper conclusion of this discussion is to return to the earlier insight that causal and teleological explanations are not mutually exclusive modes of analyzing a particular pattern of events. The main difference between the two modes is simply the perspective from which the judgement is made. Viewed from outside we are constrained to see behavior as caused by the presence of certain stimuli yet on the internal perspective the same event has the flavor of being the function of desired goals rather than of mechanical causes. A statement of Whitehead that was used in an earlier discussion makes this point very clearly. Of the actual entities which are the only really real things in the universe and which have an organismic nature he maintains that each "occasion arises as an effect facing its past and ends as a cause facing its future. In between there lies the teleology of the universe."

We can also look at the two poles of explanation which are provided by the old dichotomy of efficient cause and final cause with the realization that on the organismic interpretation of reality, they are most meaningful when viewed as aspects of the self-causation or self-creation of the entity in question.[377]

6.6 THE CHARACTER OF HIERARCHICAL EXPLANATION AND THE FLOWERING OF HUMANITY

Since it is a pronounced characteristic of this document that its discussions seem to involve trenching upon issues which range freely over the surface of man's sentient relationship with the world in which he finds himself, it may have occurred to some readers that there seems to be no

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[377] Cf., Section 3.3.2

topic which is immune from the assertions of the organismic interpretation or the meddling of the present author. Such concerns are not unfounded. When Whitehead said that modern philosophy had been ruined by its assimilation of the basic assumptions of the materialist era, he meant it. And when he offered the organismic alternative, he meant that too. To take his view seriously is to attempt to see the world from an entirely new perspective. This document is the result of one such attempt. But it must also be added that such recreated metaphysics do not assimilate all of man's characteristics into their explanatory scheme. As Whitehead said in the conclusion of his last book:

> Philosophy begins in wonder. And, at the end, when philosophic thought has done its best, the wonder remains.[378]

What we want to assert here is that there is a definite place at the top of the organismic hierarchy for just those aspects of human existence which constitute that part of man that is ever merging into the future of unrealized potential. No metaphysics can touch it since it is the explicit province of the Divine Providence that has been in evidence throughout the traditions of Revealed Religion.

Whitehead says of the God that makes the organismic world work,

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[378]Whitehead, Modes of Thought, p. 168.

> No reason can be given for just that limitation which it stands in His nature to impose. God is not concrete, but He is the ground for concrete actuality. No reason can be given for the nature of God, because that nature is the ground of rationality.[379]

While explicit consideration of such topics is obviously out of the range of this discussion, there is a legitimate sense in which we can, and indeed must, address these issues. Why this is so can be brought out in the following way.

The development of modern science began as an "unconscious derivative" from the theology which belonged to the Middle Ages. An important effect of the Judaeo-Christian tradition of God as Creator of heaven and earth was to foster an essentially static view of the world in which all things were created in their given forms. This orientation helped the early physical scientists to proclaim the world to be a mechanical system which was completely determined by physical laws. This amounts to a closed system of cause and effect in which the original order in the world which had been established by God could not now be violated by God. The predominant effect of this orientation has been to obscure the possibility of understanding the relationship between personal experience and the impersonal material world. Man has been cast in the role of an actor in a

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[379] Whitehead, Science and the Modern World, p. 178.

divine drama which is played upon the stage of the material universe. In this case, it is the human who acts and changes from scene to scene in progression toward the natural conclusion of the drama, while changes in the material stage are illusory, superficial and in no way parallel to the redemption which is obtained by the skilled actor who is successful in his role of actualizing a portion of God's Grace.

In sharp contrast to the old static view, the organismic alternative offers a dynamic interpretation of nature in which there is both structure and flexibility. In addition to views which stressed the regularity of nature, the concept of a hierarchically arranged structure requires the concept of novelty as an explanation of the fact that new levels derive from the potentialities of lower levels and also add new form to the developed potentialities of the evolving cosmos.

An important aspect of this view is that it is open to a different role for God's immanence in the world. A rather profane way of describing this relationship is to be found in the importance which attaches to the "within" of things as they are conceived to function in the organismic hierarchy. In this view, creation is a continuing and evolving process in which all levels, each to its own degree, are directly related to the immanence of God in nature.

Thus, even if one should wish to avoid all reference to anything except the narrowest interpretation of what it means to attempt to be scientific, there is an important sense in which it is not possible to do so since the history of thought amply demonstrates that the background of man's belief, as expressed in his deeply held religious convictions, forms the framework of his view of the world.

The organismic position, with its operative understanding of the process of existence opens the way to the recognition that self-cause is a more complete description of reality than the superficial dichotomy of physical causality and spiritual teleology. This realization when combined with the hierarchical model which has emerged in modern literature, contributes to a more complete understanding of the spiritual generality of man's being in the following way.[380]

In a hierarchy, it is clear that lower order principles are harnessed by the more comprehensive operating principles of the next higher stage. The result of this interaction is the production of a new comprehensive entity which operates according to principles which cannot be reduced to a

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[380] The place of spiritual factors in the composition of organismic psychology is treated more fully in Chapter 5, Sections 5.3 through 5.3.2.

description in terms of those which apply to the lower level. When we focus upon the idea of an actual entity in the Whiteheadian sense, and realize that a comprehensive entity occupies a specific level of the hierarchy by virtue of the fact that it is mostly a joint product of these two main factors, we now have the basis for the creation of a new model for psychological processes.

The psychological processes which accrue to actual entities in such a hierarchy are most generally described in the statement about the entity being an effect facing its past and a cause facing its future. This implies that the idea of process is inherent in reality; but it goes beyond that point because we are also required to admit that the teleology of the universe is operative in the turn around from effect to cause which is the process of the entity.

When we place man at the top of the hierarchy of evolved beings, an interesting thing happens. We are well aware of the source of man's derivation from the physical world and see many magnificent, though often horrible, examples of man's mastery over all those levels which are subordinate to his station. However, since we know that all levels of the hierarchical structure are the joint product of both lower <u>and</u> higher-order principles of organization, we are also obliged to acknowledge that if man is to be considered as a part of the natural order of things, he too must be the result of principles of operation that are of a higher-order nature than those which have produced beingness at any subordinate level. Two important consequences follow directly from this realization. First, all attempts to obtain an exhaustive description of man and his psychological and educational needs in terms of the content which is to be found at lower levels must necessarily fail. Second, it must also be true that some aspects of human nature are capable of being influenced by the operation of those higher principles.

Note that there is no injunction here that would in any way fetter the true search for knowledge and understanding. It is not a statement of <u>what</u> science should find as the result of its labors but an indication of the structure of things <u>within</u> which scientific investigation is carried out. There is also a very real limit to the specificity of this knowledge since, by definition, those higher-order principles which are transcendent in relation to our present level are in fact transcendent and therefore are unknowable through the outer capacities of the senses and the clarity of the rational intellect which deals most effectively with lower-order phenomena. This is what Whitehead had in mind when he said, "no reason could be given for the nature of God, because that nature is the ground of rationality."

Stated plainly, the nature of man provides open boundary conditions for the operation of higher-order principles that are responsible for the formation of a new comprehensive entity at a new level of the hierarchy. Yes, the teleology of the universe does operate in the being of man as he carries the change-over from effect to cause in the process of his life.

But this asserts that the most important, indeed, the evolving aspect of mankind is something about which he can not have explicit knowledge. How is this possible? This is where the critique of materialism which is found in Whitehead comes in. The essence of that position is that what we know about the world is not to be defined solely in terms of the way we are connected to it by the outer powers of our sensory apparatus. This is the INVERSION of knowledge that has often come up. There is something more, something of a greater generality, an inner nature of man that has additional capacities which permit the open boundaries to be maintained toward the higher principles of the evolving cosmos.

Why else would Helen Keller have the ability to demonstrate in her actions and to believe in her heart that each individual has a subconscious memory of the green earth and murmuring waters, that blindness and deafness cannot rob from him? Where else could the basis of this gift from past generations be maintained but in the larger generality which is more complete, transcendent, in relation to specific sensory information and a clear logical intellect?

Since the crux of this orientation hinges upon the ability of man to respond to and be influenced by something which is spiritual, that is, nonmaterial and not explicitly knowable in the rational sense, it will be helpful to observe the operation of a similar mechanism at lower levels of the hierarchy that we can explicitly understand.

This example comes from the biologist Alister Hardy who used it in a sense very similar to that which Waddington and Piaget develop as a description of the necessity to consider internal as well as external factors in the process of evolution.[381] Though the evolutionary mechanics to which Hardy has reference are similar, his example goes beyond theirs because it demonstrates that the role of transcendent and unknown forces can have a vital effect upon lower-order levels of living things.

External factors play an obviously important role in shaping the destiny of the organism. However, Hardy attributes those adaptations which have been responsible for the main diverging lines leading to new groups of animals, e.g., the development of running, digging, swimming and

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[381] Alister Hardy, Another View of Evolution in Biology and Personality, I. T. Ramsey, ed. (Oxford: Basil Blackwell, 1965), pp. 77-78.

flying, to the creative behavioral selection of the animal himself. This selection process is seen to be the source from within that can give rise to novelty. It is also true that such creative selection on the part of animals, including man is a continuing process and that novelty of form and function in animal life is not a thing of the past but a continuing process that forever gives rise to novelty.

Our concern is to describe a possible mechanism for this advance into novelty that can fit into the hierarchical structure while also avoiding the limiting mechanical interpretations which are based on random mechanism and the lack of insight inherent in a simple vitalism which does not explicitly relate to what we know of the world. We can observe the operation of a mechanism of this type by dropping down a couple of kingdoms in the hierarchy of living things to observe the paramount differences between the plant and animal kingdoms.

The organic life of plants is of a lower order than that of animals and the structure of the plant is largely determined by the external selective forces of the environment. Animal life, on the other hand, while being subject to the same external forms of selection as plants, also demonstrates a much greater ability for internal selection of alternative behaviors. It is in this sense that we began this chapter on the note that "the function of reason is to promote the art of life." The companion assertion that life's aim is beyond simple survival to levels of increased satisfaction, is also demonstrated in the ever increasing ability of higher levels of the evolutionary hierarchy to modify their environment.

If we examine the various adaptations to the external environment which have been made by plants, one class of adaptations stands out as an important and striking example of the hierarchical mechanism we are seeking. In developing the fantastic variety of color, structure and odor of their flowers, plants have responded in a most beautiful way to the external selective pressures which mainly derive from the behavior patterns of pollinating insects.

Pollinating insects are, however, a kingdom above plants; the possessors of qualities and capacities forever unknowable to the plants whose structure they serve to determine. In this example then, we have the type of situation which is asserted to be true of man at the top of the hierarchy. Obviously, this is not to insist that there is any concrete similarity between the two cases. We can however, assert that finding such examples at lower levels of the hierarchy where we can explicitly understand the relationships in question, also makes it possible to postulate the operation of similar functional mechanisms at the highest level of the hierarchy where we, like the plants, are not explicitly aware of the forces that mold the flowering of our own beings.

6.7 SUMMARY

From what we have seen of the old system of ideas, it is clear that it does not contain a coherent explanation of the different ontological status of living and nonliving entities. The dead matter of that system has consistently frustrated attempts at unifying observed phenomena into a single system of explanation and has forced philosophers, from Descartes on, to formulate a strict mind-body dualism in an effort to provide some place for the characteristically human sentience they knew in personal experience. The problem of vitalism which is apparent in modern biology also has deep roots in traditional dualistic philosophy. Within this view, the traditional style of scientific explanation has been in terms of physical causality which is based largely upon the supposed mechanism of the physical world. Efforts to go beyond pure physical causality have been generally categorized as teleological and relegated to the ephemeral half of the dualistic position.

Fortunately, we now have ample grounds on which to assert that the strict division between living and nonliving, mind and body, freedom and determinism, cause and purpose, etc., are useful but misleading dichotomies which do not stand up in the face of developments in modern science.

Against the standard form of scientific explanation which is predominantly reductionistic, and seeks the epitome of scientific explanation in terms of the mechanism of physico-chemical processes, popular developments in many areas have been asserting that the simple one-leveled metaphysics of materialism is too restrictive to explain the "purposiveness" of many phenomena. Aided primarily by analogy to cybernetic machines, the concept of simple physical causality (efficient cause) has been augmented to include the cybernetic type of cyclic causality. However, since the apparent "purposive" behavior of machines is the obvious result of a collection of inanimate parts, this sort of higher-order behavior is generally understood to be a direct result of the complexity of organization of the parts. One may find useful analogies in the behavior of such machines, but to equate human behavior with machines by requiring that the cause of behavior must be as exactly specifyable as the input of a machine, as in behaviorism, is to ignore the essence of what it means to be human.

A first approximation of an approach that can begin to uncover the more complete meaning of the problem of purpose is also one that grows out of modern insights into the topic of a multi-level analysis. What we have seen of this style of explanation in this chapter clearly indicates that there are important scientific reasons for maintaining that higher-level concepts and theories are not completely reducible to the terms of explanation of lower levels. This view, in which, neither the higher or the lower are less real, creates an obvious need to explain the transition between levels. The character of this transition is clearest when we are dealing with biological phenomena because at this level of complexity it is most obvious that mechanical and teleological explanations need to be balanced with each other. When viewed from without, the mechanical tendency is to analyze events in terms of "causes" and when viewed from within, the teleological tendency is to analyze events in terms of the goals or purposes of the individual entity.

In this type of discussion the single most important aspect of a multi-level explanation is the additional insight which opens the way toward appreciating the fact that the two styles of explanation (mechanical/causal vs. teleological/purposive), are in fact simply different ways of regarding the same complex entity with its pattern of events through time.

It is interesting to compare these insights which now have firm footing in the theories of modern science with the view of an individual that is of great importance to the history of psychology. The words of the pioneer of experimental psychology, Gustav Fechner, echo across the decades with a resonance almost too fine to imagine; he said, in a previously quoted passage:

> The natural sciences consistently employ the external standpoint, . . . the humanities are internal. The common opinions of everyday life are based on changes of the standpoints, and natural philosophy on the identity of what appears double from two standpoints. A theory of the relationship of mind to body will have to trace the relationship of the two modes of appearance of a single thing that is a unity.

It is at this point that the insights due to Whitehead's metaphysics become most important. By now, it is obvious that Whitehead did not intend to simply create an explanatory schema that had some hierarchical properties. On the contrary, the basis of the Whiteheadian assertion is that the actual entities whose principles of operation and interrelation he describes are in fact metaphysical entities. He is insisting that those levels also have a beingness--that they are, in fact, the real objects of which the world is composed and of which we can be directly aware. Fechner believed this to be true but he could not amass the sort of evidence that is available today which supports such a view.

The reality assertion which Whitehead makes is supported by those developments of modern science which stress the importance of the system of events that are rightful and irreducible properties of the whole which occupies a level in the hierarchy. From the exclusion principle in physics to the epigenetic systems of modern biology, and beyond, support can be found for this style of interpretation. It should also be noted that the position of "critical realism" which was reached after examining the relationship between science, philosophy and psychology also supports this conclusion.[382] Further, the initial considerations as regards the organismic interpretation of psychological process[383] also find a more complete meaning within the reality of a metaphysical hierarchy.

With the model provided by the flowering of plants in mind, we can scale the evolutionary hierarchy to the highest level of personhood in the world--mankind, with the realization that the boundaries which we recognize at the borders of our awareness are, in fact, the conditions of our lives in which we entertain the potentiality for obedience to higher demands. Man's collective and individual becoming resonates to the highest order of his attained status via the transcendent generality of his spiritual nature which functions to include the emotions, purposes and enjoyment of life as the boundary conditions of the experienced world which is the material basis of his existence.

It is in this model of man and his potentialities that we find the grounds to invert knowledge by removing the

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[382] Cf., Chapter 5, Section 5.1.5.

[383] Cf., Chapter 5, Section 5.3.

factual and the material from the center of our view of the cosmos and to replace it with the sensitive reaction of the experiencing subject himself as the ultimate determinant of the texture of reality. A reality which is constructed in this fashion reflects a recognition that man's desire to find meaning and purpose in experience comes from deep within his being and is an expression of that same upward press which in past ages was responsible for mere survival of the species and is, today, urging him onward to new attainments far removed from mere physical survival.

Thus, the human striving which we know in our own experience can be directly related to the metaphysics and epistemology of the hierarchical process interpretation of reality. It is from the internal consistency which is afforded by this interpretation that we can derive the grounds on which to assert that it offers a coherent solution to the age-old problems of psychological theory--the issue of dualism and the problem of purpose.

CHAPTER SEVEN

7.0 TOWARD AN ORGANISMIC BASIS FOR PERSONALITY AND EDUCATION

This final chapter has the goal of collecting the insights afforded by the philosophy of organism into the beginning of a model for human psychological processes. This task can be viewed as a natural outgrowth of the organismic position because, in itself, that system is an effort to frame a philosophical scheme which is a "coherent, logical, necessary system of ideas in terms of which every element of experience can be interpreted." The past discussions of the philosophy of organism in Chapter Three and the material of Chapters Five and Six, have largely been descriptive of the contrasts between mechanism and organism and explicative of the character of reality which derives from the organismic interpretation. There remains the task of being prescriptive of a framework of ideas that relates to that portion of experience which the organismic interpretation defines as the creative activity of the individual who stands as a cause facing his own future.

The psychology of personality is the most natural area of psychology in which to begin the organismic reinterpretation because the philosophy of organism is, after all, based on the paradigm of human experience. The topic of education is important not only because it is the vehicle for conveying the enlivened knowledge which derives from the hierarchical realism of organismic metaphysics but also, because it is an important factor in molding the internal experience of human beings. Since earlier discussions have clearly shown that those who think deeply about the character of human psychological processes, also tend to see the potential of man from within the explanatory framework of their psychology, it is important that the insights of the philosophy of organism should be elaborated within the framework of a model of psychological processes that can replace those old models while also opening the way to an increased appreciation of the reality of man.

Chapter Five introduced the philosophical position of critical realism which evolves into an organismic psychology appreciative of the two-way transcendence in which the being of man is embedded. These divisions were roughly described as the material and spiritual aspects of man and were further seen to be institutionalized in man's scientific and religious expressions. Central to the whole discussion was the basic metaphysical intuition of the philosophy of organism: namely, its confession of faith in the fact that the ultimate claim of existence and the true processes in the world of man, are those found in man himself. Chapter Six continued the development of an outlook which can provide a valid place for the role of internal factors in the constitution of actual entities by developing an interpretative framework of hierarchical processes. It is a basic characteristic of this view that the complexity of structure increases, so does the ability to experience increased satisfaction; it was seen that the experient individual actualizes its own self-transcendence by experiencing increased subjective value. This hierarchical view, as supported by evidence from the physical and biological sciences, ended in the realization that human experience, as the upper level of the hierarchy, was not only most removed from the compulsion of lower-order physical laws, but also was open to the influx of unknowable higher-order principles which could mold the flowering of its own being. Thus, we have a description of the possibility of purposive behavior in humans which requires recognition of spiritual factors as higher-order operatives and also subsumes the more limited notions of efficient cause and final cause under the category of self-causation.

With this material as a background, we can turn to the examination of issues in personality and education. In so doing however, it is important to keep in mind that the orientation taken toward these topics will be that which derives from the perspective of an actual entity, in this case man, in the system of a hierarchy of beings which is both purposeful and full of meaning. It is important to stress this point and to take this position because to do less than this would be to trade off much of the uniqueness of the organismic explanation before any application of its basic ideas is attempted. The material that follows uses more of Whitehead's special vocabulary and is a more technical approach to the Whiteheadian system that which has characterized the previous discussion. This is not an arbitrary choice expressive of the writer's penchant for technical detail. Rather, the issues are so closely involved with the specialized vocabulary that Whitehead created that they cannot be totally divorced from it at this point.

This discussion also attempts to bridge a gap which exists in current interpretations of Whitehead. There are many erudite technical philosophical accounts of Whitehead's philosophy. These efforts, while illuminating to the professional, are essentially written by philosophers for philosophers with little concern for practical application. On the other hand, the usual interpretation which popularizes Whitehead's thought is generally written with considerable disengagement from the technical details of the system. The result is usually a highly suggestive prose that is apt to foster creative ideas for practical applications. However, these ideas are easily pushed aside by the latest version of a long-standing approach to a particular activity. As an example, the suggestions for an "organismic psychology" presented in Chapter Five have just this status.

One more thought is important before beginning the actual topic. In each and every instance where the details of organismic cosmology have come up, an extreme effort has been required to avoid getting trapped into uncovering one level of detail after another at the expense of making some sort of coherent progress across the many opportunities for deep involvement. Nowhere however, is that problem more acute than in the present chapter. There are two main results of this condition. First, the discussion will not by any means go into the depths that are involved. Second, the final level of discussion will necessarily be a general statement of orientation as regards psychological and educational theory.

In describing the basis for the organismic approach, Whitehead was quoted as saying, "the true method of philosophical construction is to frame a scheme of ideas, the best one can." Since this scheme of ideas has been somewhat elaborated, we are now on the threshold of the next step, which is to "unflinchingly explore the interpretation of experience in terms of that scheme."

7.1 THE ORGANISMIC BACKGROUND

The concept of personality in the organismic framework is an important aspect of the being of man that is related to both his higher and lower-order characteristics. One way to phrase this condition is found in the earlier contrast between the spiritual and the material. Whitehead, at one point, referred to this as the immortal and mortal aspects of man by way of indicating that "the two words refer to two aspects of the Universe which are presupposed in every experience which we enjoy.[384] It is important to note that there are three major factors here; while the higher and the lower-order factors seem clear enough, it is necessary to stress that our concern is the experiencing being that exists as a real element on a level of the hierarchy. Not only is he our primary concern, he is also, as we shall see, the vehicle by which the two other factors are brought together. Recall that the ontological principle states "in separation from actual entities there is nothing merely non-entity--the rest is silence."[385]

From the position of the experient individual, either aspect of the Universe can only be evaluated by reference to the other. Thus, while the World of Value is conceived to be timeless and immortal, with an essence that is not "rooted in passing circumstance" and "the World of Activity, the Creative World, the World of Origination, creates the

[384]Whitehead, Immortality in The Philosophy of Alfred North Whitehead, Paul A. Schlipp, ed. (Evanston: Northwestern University Press, 1941), p. 683.

[385]Whitehead's article on Immortality provides the framework for this discussion and his terminology for the major categories involved is largely preserved.

Present by transforming the Past and by anticipating the Future,"[386]

> The description of either of the two Worlds involves stages which include characteristics borrowed from the other World. The reason is that these two Worlds are abstractions from the Universe; and every abstraction involves reference to the totality of existence. There is no self-contained abstraction.[387]

This is also another way to characterize the familiar theme of within and without that has come up in many different contexts. If it seems unfamiliar here, it is because it is couched in its most general form as the two aspects of the Universe. Starting the definition of personality at this level of generality would seem strange indeed were it not for the fact the essential criticism we have made of the past foundations of psychological theory is that it is based on premises which are abstractions of very limited generality.

While it is true that Value and Activity are only completely understood as to their interaction in the world, we can discuss them separately. In particular, the World of Value must be understood as a "general name for an infinity of Values."[388] This multiplicity of Values provides a method of describing the fact that there is order, structure,

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[386] Ibid., p. 684.

[387] Ibid., p. 685.

[388] Ibid.

and system in the Universe. Given that there are different grades of Value, and that all Values have a capacity for realization in the World of Action, then:

> The World of Values must be conceived as active with the adjustment of the potentialities for realization. This activity of internal adjustment is expressed by our moral and aesthetic judgements.[389]

We now have a statement of the process of the Universe conceived as the internal appreciation by actual entities of graded values. The result is that an "immortal factor of Value enters into the active creation of temporal fact."[390] In other words, the World of Activity, in conjunction with the World of Value can also be seen as the world of open boundary conditions and the world of higher-order principles such that their essential junction creates a new comprehensive entity. The resultant comprehensive entity, as with all comprehensive entities, can only be described in terms of the value which is actualized (its level of value cannot be explained in terms of lower-order values) while the open boundary conditions which are provided by the operation of values on lower levels can be seen as potentialities for the realization of the higher value.

7.1.1 PERSONAL IDENTITY

Actual entities, as the results of this process, can

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[389] Ibid.

[390] Ibid., p. 687.

be said to be involved in a process of evaluation. The idea of evaluation refers to the fact that an entity in the World of Activity, by being more open to some values than to others, is making an internal judgement for the embodiment of the Value. Since the internal judgement of the actual entity (the within of things) plays such an important role in the realization of Value in Fact, Whitehead asks, "Can we find any general character of the World of Fact which expresses its adjustment for the embodiment of Value?" He responds:

> The answer to this question is the tendency of the transitory occasions of fact to unite themselves into sequences of <u>Personal Identity</u>. Each such personal sequence involves the capacity of its members to sustain identity of Value.[391]

Here, we have personal identity as a description of the way order, structure and system are introduced into the world by the influence of value and it is easy to see how personal identity can function as a description of the internal consistency of the actual entities on any level of the hierarchy. The entity whose process forms "a whole sequence of actual occasions, each with its own present immediacy, is such that each occasion embodies in its own being the antecedent members of that sequence with an emphatic experience of self-identity of the past in the immediacy of the

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[391]*Ibid.*, p. 688, emphasis added.

present. This is the realization of personal identity."[392] A little further on Whitehead asserts:

> This problem of "personal identity" in a changing world of occasions is the key example for understanding the essential fusion of the World of Activity with the World of Value.[393]

Personal identity then, is the concept that makes it possible to understand how immortal values can be involved in an entity whose essential character is that of process and mortality.

> Personal identity is exhibited when the change in the details of fact exhibits an identity of primary character amid secondary changes of value. This identity serves the double rôle of shaping a fact and realizing a specific value.[394]

If personal identity is the means by which a characteristic unity is introduced into what would otherwise be an endless confusion of nothingness in the World of Fact, then it follows that the unity of that identity must be such that it functions to create a new comprehensive entity by adding its intrinsic value to the open boundaries of the elements of the World of Fact that are already structured by values of lower order. Thus, personal identity is far more than a simple aggregation of Fact into an entity of

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[392] Ibid., p. 689.

[393] Ibid.

[394] Ibid., pp. 689-690.

essentially passive character, it is, rather, a concept which expresses the dual aspect of the actual entities in the world; namely, that they shape the world and are also the vehicles for the realization of value.

The intent of this discussion becomes more obvious when it is pointed out that of all the personal identities which comprise the world of realized fact, human "personality is the extreme example of the sustained realization of a type of value."[395] That is to say, "when we enjoy 'realized value' we are experiencing the essential junction between the two worlds."[396] By introducing the idea of personality as an extreme example of the case of personal identity, we can recap the derivation of the concept in less technical terms that are more recognizable as applying to human experience.

Since personality is an elaborated example of personal identity which, in turn, is an expression of how the World of Action is internally adjusted so as to manifest a specific coordination of the World of Value, and since the infinity of Values are all interrelated into an ordered scheme, the maintenance of a specific character of personality can also be conceived of as being the relation that exists between the realized potential of the actual world

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[395] Ibid., p. 690.

[396] Ibid., p. 688.

and the infinitude of possibility that is the character of the World of Values. Each human personality is not only a product of the most elaborated realization of the World of Value in the World of Activity, but of equal importance, that personality may also be viewed as to its relation with the infinitude of possibility of the World of Values. This condition is the birthright of every actual entity in the organismic cosmology but for man it means that human potentiality may largely be seen as the realization of those higher grades of value which are recessive and yet to be actualized in the fact of his existence.

7.1.2 PERSONALITY, HIERARCHIES AND KNOWLEDGE

Now that we have come to the use of a familiar concept via a route that is unfamiliar and strange, it is well to pause to take account of our position. One of the basic reasons for the unfamiliarity is that the orientation of the argument has shifted from what it has been throughout the majority of the previous discussions. In the earliest phases we discussed the narrow abstractive character of past philosophical and scientific concepts, and gradually elaborated the growing recognition that phenomena in the world must be regarded as to their within as well as their without. From the early philosophical recognition of this truth into its modern elaborations in the physical and biological sciences, the emphasis has been on substianting the validity of the "internal" against the slings and arrows of a disbelieving, materialistically oriented intellectual world.

In extreme contrast to that approach, this discussion of personality, by assuming the orientation of the philosophy of organism, has started from the validity of internal experience and has proceeded with the analysis of the Universe from <u>that</u> position rather than through a set of abstract categories that only bear a tangential relation to the completeness of lived experience. Thus, the rather weak metaphorical statements of the previous chapter which refer to the possibility that the flowering of man's being could be the result of transcendent values of which he is only dimly aware, i.e., his religious sense as opposed to his intellectual forcefulness and clarity, have become transformed in this chapter via a different perspective on the Universe.

Since we may now define ourselves as beings in the hierarchy of organismic levels, beings who are obviously aware of their own internal experience, we already have two of the three key elements in the composition of a comprehensive being at our disposal. In descriptions of all lower comprehensive beings, we have been able, according to the logic of hierarchical relations, to define a) the lower-order principles which provide the basis upon which, b) a higher-order principle can formulate, c) a new comprehensive entity with its own distinctive characteristics. In considering ourselves, it is most truthful to say that we are primarily aware of ourselves as comprehensive beings with distinctive characteristics and that we are only secondarily aware of the explicit character of either set of principles which border our being and mold its character.

Of the two sets of principles, it is certainly true that our intellectual understanding of the various subordinate grades of being in the hierarchy has occupied the greater portion of modern man's efforts. These efforts are known under the general heading of "Science" and are generally explicitly recognized as being the product of man's intellectual analysis of the data which are presented to his sensory faculties. Man obviously has a great capacity for this type of activity. His mind is a supreme instrument of analysis, apparently capable of penetrating the mysteries of all phenomena that it can know through sensory processes and analyze with the rational intellect.

However, the information gained in this fashion tells only part of the story. It necessarily only refers to the analysis of lower-order levels of being and beyond that, it has been primarily concerned with the analysis of the external aspects of those phenomena. The meaning of materialism in science and society is to be found in just this aspect of our cultural heritage. Our predominant orientation has been toward the external aspects of lower-order phenomena. Obviously, scientific knowledge is a powerful instrument of great value to humanity. But it is an abstraction from the complete Universe. It has been developed primarily in abstraction from the World of Values and does not contain an elaborated reference to the totality of existence.

The growth of philosophical and scientific concepts that have increasingly come to support the validity and necessity of recognizing the role of internal factors in the composition of phenomena has provided the second major element in the hierarchical triumvirate. But we have not been allowed to become complacent in this realization; the character of the explanation itself requires the existence of the third major element. It is the function of this element to provide the higher-order goal that is to become actualized in the level upon which a new comprehensive entity is being formed. We may also say that it is in the operation of this element that we can find the mechanism to answer the problem of why the trend of evolution has been upwards. All entities have an essential reference to the World of Value, and since that World is a multiplicity of ordered Values, the evolutionary course of the actual world must follow the graded structure of the World of Value.

7.2 THE ORGANISMIC FOREGROUND

Formulating a model for personality processes that is in harmony with the organismic approach requires an investigation of the idea of actual entity. As we have seen, Whitehead has based his philosophical formulation on the use of this concept which was derived by analogy to human experience. Of course, the human experience he refers to is significantly different than the model of human experience that was the basis of the early formulations in science and philosophy. In that case it was assumed that sense experience was the only means by which the reality of the physical world could be known. It seemed reasonable at the time that a dualism of mind and matter should exist and that matter was essentially inert and of a completely different realm. Whitehead's use of human experience involves the notion that all things in the world have a "beingness" that involves experience. That is, even atomic "things" are seen as atomic events which are connected with one another in much the same way that successive occasions of human experience are interconnected.

7.2.1 THE ACTUAL OCCASION AND HUMAN EXPERIENCE

In defining the character of an actual entity Whitehead maintains:

> . . . the actual world is a process, and that the process is the becoming of actual entities. Thus actual entities are creatures; <u>they are also termed "actual occasions</u>."[397]

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[397] Whitehead, <u>Process and Reality</u>, p. 27, emphasis added. It is important to keep this similarity in mind.

It is here that one finds the basis of "process" philosophy--"the actual world _is_ a process" and actual entities are, in fact, occasions in that process. The idea of occasion is important because it permits experience to be unitized without also making disconnected particles out of things. In relating the idea of an actual occasion to experience as we know it, Whitehead holds that "an occasion of experience is an activity, analyzable into modes of functioning which jointly constitute its process of becoming." He further asserts that, "each mode is analyzable into the total experience as active subject."[398] His concern here is to avoid the dissolution of the occasion into pieces that would appear to take on a separate reality in addition to that of the actual occasion. An actual occasion must be considered as to its unity which, since it is an event in the life of an individual, be it an atom or a person, is best characterized by regarding it as to its subjective forms of self-enjoyment.

While the doctrine sounds strange, it does function well in the integration of scientific information. For example, Whitehead demonstrates that the vector transmission of energy in the physical sciences can be explained as a succession of "physical prehensions" (to be defined below) and says of his doctrine:

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[398] Whitehead, _Adventures of Ideas_, p. 176.

> In the language of science, it describes how the quantitative intensity of localized energy bears in itself the vector marks of its origin, and the specialties of its specific forms; it also gives a reason for the atomic quanta to be discerned in the building up of a quantity of energy. In this way, the philosophy of organism--as it should--appeals to the facts.[399]

In focusing our concern on the actual entity of the high grade human personality, we can best start from the familiar topic of inversion. It is in the analysis of an actual occasion that the topic finds its clearest expression. Sense experience, as would be expected, does not play a fundamental role in the determination of an actual occasion; its role is important but not fundamental. Sense data, as the most variable element in our lives, also appear to be the most definite and are traditionally thought of as being the basis for the mind against which all other experiences should be evaluated, i.e., emotions, fears, love, hate, intentions, etc.. Whitehead denies this for several reasons: a) loss of sensory modalities does not necessarily mean death, b) states of sleep, meditation and prayer have nothing to do with sense perception and c) after birth the use of sense data is only a gradually acquired art of correlating fundamental experience with unique sense data.[400] Thus, the basic priority in experience is not dependent on

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[399] Whitehead, Process and Reality, p. 138.

[400] Whitehead, Modes of Thought, p. 112.

learning how to correlate sense experience with the environment. This is easiest to see at lower levels than man. In the extreme case, even beings with a low level of bodily organization, e.g., the amoeba, react to the external world in ways that suggest that they possess a sense of being and recognition of the objectivity of the world. On the other hand, the most highly developed sensory abilities belong to the animals and not man.[401] Again, sense experience is important but it is, none-the-less, a product of our more basic bodily experience; it therefore, enhances appreciation of reality but it does not totally determine the character of that reality.

This point is best seen in Whitehead's use of the evidence of physics and physiology to support his position. In applying this scientific evidence to an occasion in the experience of a human actual entity, he asserts:

> Unless the physical and physiological sciences are fables, the qualitative experiences which are the sensations such as sight, hearing, etc., are involved in an intricate flux of reactions within and without the animal body. These are hidden below consciousness in the vague sense of personal experience of an external world.[402]

It is not necessary to go into the multitudinous data referent to the actual processes and physiology of the human

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[401] _Ibid._, p. 113.

[402] _Ibid._, p. 121.

organism to appreciate the point at issue. Our awareness of the external world obviously involves many stages of complex neural organization in the body and the brain. Further, the result of this tremendously complex activity is the experience of the world which is external to the body. That is to say, molecular events in the external world interact with light in such a way that when the light strikes the retina, and the subsequent phases of processing ensue, we have an experience of these events in our brain, not as events in themselves, but as a quality of the external world which is projected back into space at the same location where the original molecules are located.[403] An example will help to make the point more explicit; Whitehead says,

> For example, "I see a blue stain out there," implies the privacy of the ego and the externality of "out there." There is the presupposition of "me" and the world beyond. But consciousness is concentrated upon the quality blue in that position. Nothing can be more simple or more abstract. And yet unless the physicist and the physiologist are talking nonsense, there is a terrific tale of complex activity omitted in the abstraction.[404]

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[403]This statement is an answer to the problem left open in Chapter 2, Section 2.2.2 where the following statement seemed unintelligible. "In the process framework, space and time are not the containers into which matter can be placed and therefore simply located; rather, a region of space and time is a simply located unit of realized experience." The material of the present section provides a further amplification of this theme.

[404]Ibid.

This complex activity is obviously physical activity in the normal sense of that term; that is, there is <u>no</u> consciousness involved in any of those necessary complexities that enter into the final conscious experience of the external world. Another quotation will help to provide a basis for discussion of this topic:

> This survey supports the view that the predominant basis of perception is perception of the various bodily organs, as passing on their experiences by channels of transmission and enhancement. . . . According to this interpretation, the human body is to be conceived as a complex "amplifier"--to use the language of the technology of electromagnetism. The various actual entities, which compose the body, are so coordinated that the experiences of any part of the body are transmitted to one or more central occasions to be inherited with enhancements accruing along the way, or finally added by reason of the final integration. The enduring personality is the historic route of living occasions which are severally dominant in the body at successive instants.[405]

Thus, the final stages of conscious perception are the result of a myriad of events that go on inside our bodies as a result of the impact of the physical world. Whitehead terms this unconscious physical derivation of consciousness the "physical pole"[406] of experience which is the means by which we know ourselves as "a historic route of occasions." That is, we experience a derivation from our immediate past.

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[405]Whitehead, <u>Process and Reality</u>, p. 140.

[406]<u>Ibid</u>., p. 280.

Yet, at the same time, all those events are hidden from consciousness. This aspect of the physical pole of experience Whitehead terms "physical prehension."[407] Physical prehension is the means by which one occasion of experience is related to its predecessor such that the prior occasion functions as a cause for the later occasion. This causal relationship between actual occasions, which are the elements from which the final conscious occasion we know in experience is constructed, is known as "causal efficacy."[408]

> My process of "being myself" is my origination from my possession of the world.[409]

Thus, one physical prehension follows upon the other as thousands of them are involved in mediating the final production of high-level conscious experience. Again, these basic events which are causally efficacious in experience are actual entities which function as building blocks in experience; but we also know that these various actual entities have to add up, in some fashion, to the central occasion that is of the much higher-order level of experience we know in consciousness. This latter mode of experience is known as "presentational immediacy,"[410] it arises out of the

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[407] Whitehead, Adventures of Ideas, pp. 234-238.

[408] Whitehead, Process and Reality, p. 99.

[409] Ibid.

[410] Ibid., p. 79.

causally efficacious background as a synthesis of its data. It is in this mode experience that we find the basis for the descriptions of sense data that have been the basis for traditional philosophy. Whitehead's formulation makes it clear that a more complete analysis of experience necessarily involves a description in terms of the scientific data we have regarding the operation of the causally efficacious bodily functions that underlie final perception. When this is done, it is seen that the objects in the environment which we know in presentational immediacy and which we generally assume to be the causally efficacious elements in our perception of the world are, in fact, derivative from the truly causally efficacious data that constitute our physical prehension of the world of actual entities.

The role of the synthesis of actual entities that leads up to the familiar aspects of presentational immediacy we directly experience can be shown as follows. In an earlier example, Whitehead demonstrated that forming the idea of a patch of blue, located in the environment, was in fact a very abstract concept. This is so because we know that the events which take place in the retina and various other parts of the brain do not, in and of themselves, have any quality that resembles "blueness." Since neurons most certainly are not blue, it must be that some quality is abstracted from the causally efficacious events that yields the final percipient event of "I see a blue stain out there." It is in this sense that the final perception of a quality "out there" in the environment may be said to be both simple and abstract. It is simple because it appears that the occasion of experience is a direct function of the thing experienced. It is abstract because the exact opposite is the case; the object in the environment is actually a contribution of the experiencing subject whose lower-order causally efficacious physical prehensions have been "transmuted"[411] (transformed) into an occasion of experience. This is also known as the "mental pole" of the occasion of experience. Whitehead maintains that all actual entities are bipolar, that is, they have both a physical side and a mental side. However, only in the case of high grade entities does the mental aspect play an important role. This, Whitehead maintains is the basis for the solution of the mind-body problem of traditional philosophy and psychology.[412]

Each actual entity is an integration of its physical and mental aspects into a unity. As far as the mind-body problem is concerned, it is the physical pole of the entity that relates to the spacial aspects of nature while the mental pole of the entity is primarily concerned with the conceptual emphasis of aspects of the experience and also

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[411] Ibid., p. 32.

[412] Ibid., p. 128.

with the introduction of novelty. Whitehead says:

> So though mentality is non-spacial, mentality is always a reaction from, and integration with, the physical experience which is spacial. . . . All the life in the body is the life of individual cells. There are thus millions upon millions of centers of life in each individual animal body. So what needs to be explained is not dissociation of personality but unifying control, by reason of which we not only have unified behavior, which can be observed by others, but also consciousness of a unified experience.[413]

It is the formation of this unified experience that is, as Whitehead believes, the primary fact that needs to be explained in the determination of the final actual entity. The model of hierarchical beings developed earlier helps to clarify this point.[414] The beings who are the actual entities on the lower scales of the hierarchy have very rudimentary levels of integrated mental poles of experience. It is only as one rises higher in the hierarchy that the center of experience becomes more prominent in the composition of the entity. Finally, in man, centrality of control is elaborated to its highest peak while the physical pole or causally efficacious aspects of experience are relegated to the background of experience.

> In a living body of a high grade type there are grades of occasions so coordinated by their paths of inheritance through the body, that a peculiar richness of inheritance is

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[413] <u>Ibid</u>.

[414] Cf., Chapter 6, Section 6.2.

> enjoyed by various occasions in some parts of the body. Finally, the brain is coordinated so that a particular richness of inheritance is enjoyed now by this and now by that part; and thus there is produced the presiding personality at that moment in the body.[415]

This description, of the way the experiences of the lowest level entities of the body are coordinated so as to be transmitted to evermore integrated experiences, finally culminating in the production of one of the central occasions that forms an occasion in the life of a human personality, should be looked upon not only as a solution to the mind-body problem but also as a complement to two themes that were of importance to earlier sections. First, in the immediately preceding section, the idea of personal identity and ultimately of human personality was seen to be the result of the most highly sustained realization of the World of Value in the World of Fact. That interpretation was also shown to be compatible with the model of hierarchical organization which thereby provided a means by which that very abstract formulation could be related to more concrete matters. In terms of the present context, when speaking of the integration of actual entities into higher-order occasions of experience, it should be recognized that we have covered two of the three elements which were descriptive of each level in the hierarchy. The accounts of successively more

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[415] Ibid., pp. 128-129.

integrated actual entities describe an operational version of the earlier distinction between a new comprehensive entity and the lower-order principles of operation out of which it arises. Thus, in the present context, for all of its complexity, we have yet to provide for the rôle of the all-important third element of hierarchical logic, namely, the higher-order principles by which the new comprehensive entity is formed. We will come to this element presently, after considering the second theme of the earlier discussion that is important to this context.

Here, we have reference to the familiar theme of within and without that was developed as the mainstay of the arguments of those who initially sought to surpass the limitations of the mechanistic scheme. In the present context, we can repay the debt of gratitude owed to this concept by explaining it from the perspective of an actual entity that has both mental and physical (within and without) aspects. Whitehead has done this in a way in which it seems certain that Gustav Fechner and Wilhelm Dilthey, to name only two, would have deeply appreciated.

> In principle, the animal body is only a more highly organized and immediate part of the general environment for its dominant actual occasion, which is the percipient. But the transition from <u>without</u> to <u>within</u> the body marks the passage from lower to higher grades of actual occasions. The higher the grade, the more vigorous and the more original is

> the enhancement from the . . . [mental pole of experience].

Here, and in its proper organismic context, we can expand upon the role of the within or the mental pole; this expanded definition also opens the way toward appreciating the true character of the formative third element that has yet to appear in the discussion. Whitehead continues,

> Pure receptivity and transmission gives place to the trigger-action of life whereby there is a release of energy into novel forms. Thus the transmitted datum acquires sensa enhanced in relevance or even changed in character by the passage from the low-grade external world into the intimacy of the human body.[416]

7.2.2 MENTALITY AND SUBJECTIVITY

Thus, the formative third element in the system of hierarchical logic may also be defined as the mental pole or the seat of the introduction of novelty into the formation of higher-order actual occasions. There are complex characterizations of the process by which this novelty is introduced which can be omitted in the present discussion. In its most general form the introduction of novelty is called the "subjective form" of the prehension.[417] This subjective form is a product of what the actual entity prehends. Two extreme cases will help to clarify the point. First, the physical prehension, as we have seen, is one in which the

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[416] Ibid., p. 141, emphasis added.

[417] Ibid., p. 28.

object of the occasion is another actual entity. In this case, the new occasion simply inherits the subjective form that belongs to the antecedent occasion. This is the primary mode of low-order entities in which the mental pole is not highly developed. Thus, the second case is one in which the mental pole can be thought of as highly developed such that it dominates in the occasion. Here, the prehensions are called "conceptual prehensions"[418] rather than physical prehensions because the objects prehended are not in the physical past of the occasion but are forms, qualities or relations (pure potentialities) which can be considered in abstraction from any particular actual occasion. The objects of this conceptual prehension are known as "eternal objects."[419] Of this condition Whitehead remarks:

> Thus the process of becoming is bipolar, (i) by reason of its qualification by the determinateness of the actual world, (physical prehension) and (ii) by its conceptual prehensions of the indeterminateness of eternal objects. The process is constituted by the flux of eternal objects into a novel determinateness of feeling which absorbs the actual world into a novel actuality.[420]

Examining the role of eternal objects and the idea of novelty more closely will help to round out this brief treatment of

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[418] Ibid. Whitehead also adds that "consciousness is not necessarily involved in the subjective form of either type of prehension."

[419] Ibid., p. 58.

[420] Ibid., p. 59.

Whitehead's detailed metaphysical statements and will also open the way toward understanding his system in relation to the logic of hierarchical relations, the third or higher-order element of which is still unaccounted for.

It is first necessary to distinguish the idea of "subjective form" from that of "subjective aim." In an earlier statement, in conjunction with introducing the organic nature of an actual occasion, the idea of subjective form of self-enjoyment was used as a means of underlining the unity of an actual occasion and its nature as an event in the life of an individual (atomic or human). Subjective form describes how the actual occasion interacts with its environment. In Whitehead's terminology, "there are many species of subjective forms, such as emotions, valuations, purposes, adversions, aversions, consciousness, etc.."[421] The unity and character of a subjective form is derived from the eternal objects which are involved in the prehensions of the occasion. Physical prehensions contribute to the realization of eternal objects which were included in the past actual occasions prehended at the physical pole of experience. In addition to this way of contacting eternal objects, the conceptual prehension of the present actual occasion, to the extent that it is developed, also directly prehends the eternal objects via the mode of conceptual prehension.

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[421]Whitehead, Process and Reality, p. 28.

Conceptual prehension is the primary source of novelty because of its direct reference to a definite eternal object. This definite reference provides additional grounds upon which the subjective form of the actual occasion is modified. A conceptual prehension therefore, may be seen as a valuing or devaluing of the eternal objects which were present in the physical pole of the occasion. Thus, even if there are no further grounds for the introduction of novelty, the mechanism of conceptual valuation which results from conceptual prehension can be seen to provide the basis for autonomous action on the part of each new actual occasion; this is "subjective aim."

7.2.3 THE SOURCE OF SUBJECTIVE ORIGINALITY

The concept of "subjective aim"[422] adds an element to the process of an actual occasion that is responsible for actively shaping what the occasion is to become. Whereas prehensions at the physical pole involve the use of past actual occasions as objects (objectification) such that they "constitutes the <u>efficient causes</u> out of which that actual entity arises; the 'subjective aim' at 'satisfaction' constitutes the <u>final cause</u>, or lure, whereby there is . . . [a determinant actual occasion]."[423] In the formation of final

[422]<u>Ibid.</u>, p. 24.

[423]<u>Ibid.</u>, p. 105, emphasis added.

cause Whitehead is referring to the fact that each actual occasion is ultimately responsible for its own nature, it may inherit from the past and it may introduce some novelty via conceptual valuation of eternal objects, but there is a much stronger sense in which each actual occasion is, in fact, its own subject and by which it becomes a unique individual. It would therefore appear that some additional input is required for the introduction of the characteristics which constitute the individuality of the occasion and its ability to transcend the data which are given to it via its other sources. Such indeed is the case.

> The initial stage of its aim is an endowment which the subject inherits from the inevitable ordering of things, conceptually realized in the nature of God.[424]

However, this inheritance from God does not mean that the actual occasion is thereby determined and without freedom. It is more correct to say that the rôle of God is to provide for each actual occasion a vision of the ideal that it might achieve. Further, it is in the attainment of this vision that the actual occasion finds its maximum satisfaction.[425] On this point Whitehead maintains,

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[424] Ibid., p. 286.

[425] Satisfaction as used here is a technical term that refers to the idea of what the actual occasion will be once it has completed the process of becoming. In terminating its process of becoming (satisfaction) the actual entity becomes a datum for the physical prehension of future actual occasions.

> What is inexorable in God, is valuation as an aim towards "order"; and "order" means "society" permissive of actualities with patterned intensity of feeling arising from adjusted contrasts. In this sense God is the principle of concretion; namely, he is that actual entity from which each . . . [actual occasion] receives that initial aim from which its self-causation starts.[426]

Thus, it is in the nature of God's interaction with the world that one finds the basis for the self-causation that is required if there is to be any freedom in the world. Subjective aim as derived from God's immanence in the world, is the means by which the relevance of eternal objects in conceptual prehension is determined and also, is the basis for evaluating the physical prehensions of the actual entities which are in the past of present actual occasion. In this way, God and the actual world are seen to jointly form the character of the creative actual occasion. Since actual occasions are bipolar, that is, since they have both a physical and mental pole, then it is clear that whether the outcome of the actual occasion is a simple physical re-enactment of past pattern, therefore nonmental, or whether the occasion achieves some highly novel form of mental integration that modifies the character of the whole occasion, this process is one of self-determination in which the actual occasion is always its own autonomous master.

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[426] Ibid., p. 286.

> God's immanence in the world in respect to his primordial nature is an urge towards the future based upon an appetite in the present. Appetition is at once the conceptual valuation of an immediate physical feeling combined with the urge towards realization of the datum conceptually prehended. For example, "thirst" is an immediate physical feeling integrated with the conceptual prehension of its quenching.
>
> Appetition is an immediate matter of fact including in itself a principle of unrest, involving realization of what is not and what may be. The immediate occasion thereby conditions creativity so as to procure, in the future, physical realization of its mental pole, according to the various valuations inherent in its various conceptual prehensions.[427]

On numerous occasions in past discussion, we have been able to summarize important aspects of the topic at hand by repeating a quotation. Here too, it is possible to do so with the added advantage of also implicating those past discussions in the present context.

> The point to remember is that the fact that each individual occasion is transcended by the creative urge (appetition), belongs to the essential constitution of each such occasion. It is not an accident which is irrelevant to the completed constitution of any occasion.
>
> In the formation of each occasion of actuality the swing over from re-enaction to anticipation is due to the intervening touch of mentality. Whether the ideas thus introduced by the novel conceptual prehensions be old or new, they have this decisive result, that the occasion arises as an effect facing its past and ends as a cause

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[427] *Ibid.*, p. 37.

> facing its future. <u>In between there is the teleology of the Universe.</u>[428]

We have, therefore, come to the final answer to the major question which has been implicit in the last three chapters. Organismic metaphysics and process philosophy require the concept of God as an inseparable reason for the advance of the world. Thus, implicit in those earlier discussions of teleology, organism, self-causation, science, evolution, etc., has been the realization that God is the ultimate urge toward the realization of potential. His rôle is that of an all-pervasive influence that gives form and direction to actuality; He is the single source of order and His immanence is the ultimate answer to the question,

> Why has the trend of evolution been upward?[429]

It seems somewhat unnecessary to point out that we need search no further for the answer to the question as to the source of the third element in the system of hierarchical logic that is responsible for the formation of a new comprehensive entity. Whitehead puts it thusly:

> . . . God can be termed the creator of each temporal actual entity.[430]

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[428] Whitehead, <u>Adventures of Ideas</u>, pp. 193-194, emphasis added; cf. also, Chapter 3, Section 3.3.2.

[429] Whitehead, <u>The Function of Reason</u>, p. 7; cf. also, Chapter 6, Section 6.1.

[430] Whitehead, <u>Process and Reality</u>, p. 263.

7.2.4 THE PROBLEM OF ETERNAL OBJECTS

Up to this point, the role of "eternal objects" has been implicated in the vital processes of an actual occasion without much explanation, or at least any attempted explanation, of their rather enigmatic character. Some of the problems in dealing with eternal objects are easily seen. First, there is Whitehead himself, who, in one of his very infrequent personal letters, said to Charles Hartshorne,

> There is one point on which you and--everyone--misconstrue me--obviously my usual faults of exposition are to blame. I mean my doctrine of eternal objects. It is a first endeavor to get beyond the absurd simplemindedness of the traditional treatment of Universals.[431]

Whitehead made this statement well after the doctrine was widely publicized in a systematic fashion in both Science and the Modern World and Process and Reality.[432] Second, it should be pointed out that Whitehead reserves the use of the term eternal object for those contexts in which he is developing his metaphysics in a systematic fashion. In his other major works, i.e., Adventures of Ideas and Modes of

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[431]Whitehead, Letter to Charles Hartshorne in Alfred North Whitehead: Essays on His Philosophy, George L. Kline, ed. (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963), p. 199.

[432]The statement dates from 1936 whereas Science and the Modern World was published in 1925 and Process and Reality was published in 1929.

Thought as well as the lesser ones like Religion in the Making, Symbolism and The Function of Reason Whitehead only used the term briefly (six times in Adventures of Ideas); it does not occur in the remainder of his published works.[433] Third, there are many equivalent expressions which are used to carry the meaning of the more precise terminology.[434] Fourth, the philosophical reasons for getting involved in the concept are anchored deep in tradition and are also contemporary problems. For example, Whitehead sees Plato's use of Universals in the following way:

> When Plato is faced with the problem of expressing the relationship of God to the World, and of the relation to the World of those Ideas which it is in God's nature to contemplate, Plato's answer is invariably framed in terms of mere dramatic imitation. When Plato turns to the World, after considering God as giving life and motion to the ideas by inclusion of them in his divine nature, he can find only second-rate substitutes and never the originals. For Plato there is a derivative second-rate God of the World, who is a mere Icon, that is to say an image. Also when he looks for the ideas, he can only find, in the World, imitations. Thus, the World, for Plato, includes only the image of God, and imitations of his ideas, and never God and his ideas.[435]

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[433] William A. Christian, An Interpretation of Whitehead's Metaphysics (New Haven: Yale University Press, 1959), p. 195.

[434] Some examples from Christian's summary (Ibid.) are as follows: forms, ideal forms, ideal forms of possibility, abstract forms, eternal forms, possibilities, abstractions and potential forms.

[435] Whitehead, Adventures of Ideas, p. 215, quoted in Ibid., p. 198.

It is Whitehead's feeling that metaphysics should admit to no gap between God and the World; the union should be complete and mutual. That is to say, "what metaphysics requires is a solution exhibiting the plurality of individuals as consistent with the unity of the Universe, and a solution which exhibits the World as requiring its union with God, and God as requiring his union with the World," the doctrine of eternal objects was created to fill just this need.[436]

> It is the foundation of the metaphysical position which I am maintaining that the understanding of actuality requires a reference to ideality. The two realms are inherent in the total metaphysical situation. . . . Eternal objects are, in their nature, abstract. By abstract I mean that what an eternal object is in itself--that is to say, its essence--is comprehensible without reference to some one particular occasion of experience.[437]

We are thus provided with an important clue to the nature of eternal objects. As in the previous section, where the description of either the World of Value or the World of Fact necessarily involved characteristics borrowed from the other world, here too, both the realm of actuality and the realm of ideality are inherent parts of the whole metaphysical situation. But what _is_ the whole metaphysical situation? Simply, according to the ontological principle, the answer must be--actual entities. That is, what is real and concrete

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[436] Whitehead, _Ibid_., p. 168.

[437] Whitehead, _Science and the Modern World_, pp. 158-159.

are the actual occasions of experience which belong to actual individuals. Thus events are concrete and objects are abstract in the sense that they can only be understood in relation to an actual occasion. There are only two classes of objects in the Whiteheadian system and both have this relationship. An actual occasion prehends the world in two ways, at its physical pole and at its mental pole. At the physical pole there are past actual occasions which have become "objectified" as data for the new actual occasion. While those prehensions at the mental pole of the occasion are prehensions of "eternal objects." Whitehead says of both types of prehension that:

> The positive prehension of an entity by an actual entity is the complete transaction analyzable into the ingression, or objectification, of that entity as a datum for feeling, and into the feeling whereby this datum is absorbed into the subjective satisfaction.[438]

There are many things which could be said about the nature of eternal objects that are outside the focus of this discussion. Obviously, their nature as abstract pure potentials for the becoming of actual occasions is a difficult concept to express and Whitehead was clearly frustrated by it. It is the opinion of this writer that much of the difficulty in interpreting this concept is due to a failure to take Whitehead's system on its own terms. Unless one is

[438] Whitehead, Process and Reality, p. 66, emphasis added.

willing to explicitly grant, as Whitehead does, the central rôle in Creation to God, then the concept of eternal object, as forcefully put forth by Whitehead, appears inconsistent with the way the world is usually thought of in science and philosophy. This writer has no trouble in agreeing with Whitehead on this point. The rôle ascribed to God in the philosophy of organism is the key term in recreating the metaphysical basis for scientific and philosophical activity.

Since God is the ultimate element of coherence in the Whiteheadian system, we can best close this account of the details of Whitehead's cosmological system and the enigmatic character of eternal objects with a brief summary of the nature of God's participation in the processes of organismic actual occasions.

7.2.5 THE IMMANENCE OF GOD

In entering this discussion of the nature of God as it applies within the philosophy of organism, it is important to remember that the discussion bears only on the metaphysical nature of God's action in the world as it appears from within the system of organismic metaphysics. It is not the intent of this discussion to make either theological or religious assertions about the nature of God. Obviously, there are implications which can not be ignored as regards one's personal outlook; however, for the purposes of this discussion the God of Whitehead's cosmology should be seen as an alternative to the God that was the "Father" of the mechanistic world-view of the past scientific era.

Throughout the discussions of organismic metaphysics, the ontological principle has provided the explicit statement that everything must be thought of as existing in some actuality. That is, Whitehead does not believe that explanations can float around in a void until they are needed to explain some fact of actuality. On the contrary, in a realist system, everything must be some place that is "real" or it will be imaginary; that is to say, unreal. Therefore, Whitehead locates the general potentiality of the universe, that must be somewhere, in a very special actual entity known as the nontemporal actual entity or, God.

Since the temporal actual occasions arise by their participation in (prehension of) that which is timeless and abstract, that is, the objectified world of past actual occasions and the realm of eternal objects, some means of combining that which is temporal with that which is nontemporal (objectified) is required. Whitehead maintains,

> The things which are temporal arise by their participation in the things which are eternal. The two sets are mediated by a thing which combines the actuality of what is temporal with the timelessness of what is potential. This final entity is the divine element in the world.[439]

Thus, God is seen to be the divine element which is the

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[439] Ibid., p. 53.

ultimate ground for connecting Value and Fact, potentiality and actuality.

It is also in this connection that the basis for the creative advance is to be found. This is accomplished by the condition in which it is in God's nature to value the entire realm of eternal objects. That is, there is a certain togetherness in the realm of eternal objects that grades them into a hierarchy of relationships with one another.[440] Thus, the order inherent in the realm of eternal objects and their reflection in the creative order of the world are both a direct function of the relevance of God. In the more general terms of the previous section of this chapter, this means that God is both the "persuasive coordination of the essential multiplicity of Creative Action" and also, "he is the unification of the multiple personalities received from the Active World."[441]

The earlier reference to God as a nontemporal actual entity, that is, as the actuality wherein the potentialities of the Universe are ordered and whereby creativity is conditioned, introduces an important aspect of the relation between God and the World. Since the nature of God is not subject to the temporality of the created world, i.e., He is eternal, it cannot be said that there is a past for God.

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[440] Whitehead, Science and the Modern World, p. 160.

[441] Whitehead, Immortality, p. 694.

Further, since it is the past of an actual occasion that is objectified in the prehensions at the physical pole of each temporal occasion of experience, it is the conceptual or mental pole of God's nontemporal nature that predominates in the divine occasion. This is known as the "primordial nature"[442] of God in which the unity of conceptual feeling includes all eternal objects, graded in the relevance of God's vision. The physical pole of God's nature is known as God's "consequent nature"[443] and derives from God's prehension of the actual entities of the actual world. It is in this way, therefore, that pure potentiality and actuality are combined. Whitehead expressed this at one point as follows:

> This is the conception of God, according to which he is considered as the outcome of creativity, as the foundation of order, and as the goal towards novelty. "Order" and "novelty" are but the instruments of his subjective aim which is the intensification of "formal immediacy."[444]

And, in a less technical terminology

> The wisdom of [God's] subjective aim prehends every actuality for what it can be in such a perfected system--its sufferings, its sorrows, its failures, its triumphs, its immediacies of joy--woven by rightness of feeling into the

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[442] Whitehead, Process and Reality, p. 105.

[443] Ibid.

[444] Ibid., p. 106.

> harmony of the universal feeling, which is always immediate, always many, always one, always with novel advance, moving onward and never perishing. . . . The image--and it is but an image--the image under which this operative growth of God's nature is best conceived, is that of a tender care that nothing be lost.
>
> The consequent nature of God is his judgement on the world. He saves the world as it passes into the immediacy of his own life. It is the judgement of tenderness which loses nothing that can be saved. It is also the judgement of a wisdom which uses what in the temporal world is mere wreckage.[445]

And finally, there is metaphysical poetry,

> What is done in the world is transformed into a reality in heaven, and the reality in heaven passes back into the world. By reason of this reciprocal relation, the love of the world passes into the love in heaven, and floods back into the world. In this sense, God is the great companion--the fellow-sufferer who understands.[446]

We can conclude the investigation of the necessity of including the rôle of God in organismic metaphysics on the above note. It would appear that not only is the nature of God a necessary element for the coherence of Whitehead's system, but also, that the resultant intimate connection between God and his creation resulting from the organismic approach is one which opens the way toward enhanced depth of feeling in individual experience. It seems quite certain that this is what Whitehead had in mind when he said

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[445] Ibid., pp. 407-408.

[446] Ibid., p. 413.

"breadth of thought reacting with intensity of sensitive experience stands out as an ultimate claim on existence."[447]

It should also be added that the intent of this limited consideration of Whitehead's detailed metaphysics has been to prepare the ground for the next section. Though the details considered above have been lengthy, even if very sketchy, there are important elements that have yet to be introduced. These topics will be considered as an introduction to a summary statement of the key problems which the philosophy of organism places upon the doorstep of contemporary psychology and education.

7.3 MACROCOSMIC ORGANISMIC RELATIONS

We can begin by noting that the disparity which exists between the technical philosophical and popularized versions of Whitehead's thought, which was mentioned at the beginning of the chapter, is also present in Whitehead's writings. Whitehead himself had a problem in bridging the gap between the systematic terminology of the philosophy of organism and concepts which are used in the usual descriptions of experience. The problem in the formulation of terminology applying to eternal objects cited above, is a case in point. However, a multiplicity of terminology does not mean that Whitehead was unsure of the concept he had in mind. In fact, it would seem that the clarity and forcefulness of

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[447] _Ibid._, p. 20.

the concept in his mind must have been at the basis of his usual ability to come up with a highly suggestive metaphor or a few evocative words that could carry the meaning of his more precise philosophical insights. While the richness added by such discussion is important beyond estimation, it is, however, often difficult to tell whether Whitehead is attempting to develop a systematic term or to create a plain language bridge into a philosophical detail. One such terminological problem lies at the base of those aspects of the system that were reserved for inclusion in this section.

Since the previous section focused primarily upon the microcosmic nature of an actual occasion, there was little opportunity to go beyond those details into a consideration of how they are related to the macrocosmic world that we know in everyday life. This section, therefore, considers the macrocosmic aspect of the philosophy of organism. The problem in terminology that is found in this aspect of Whitehead's thought centers around the use of the term "organism." Since Whitehead called his system the philosophy of organism, it would appear that there is some precise meaning in the term. But if microcosmic actual occasions are organismic, what is the status of the macrocosmic organisms in the world that we know in experience? As it happens, "organism" is not a systematic term for Whitehead when he is dealing with macrocosmic entities.[448] Whitehead himself maintains that:

> In the philosophy of organism it is held that the notion of "organism" has two meanings, . . . namely the microscopic and the macroscopic meaning. The microscopic meaning is concerned with the formal constitution of an actual occasion. . . . The macroscopic meaning is concerned with the givenness of the actual world, considered as the stubborn fact which at once limits and provides opportunity for the actual occasion.[449]

Clearly, the meaning of organismic relations is different in each case. For the actual occasion, organism refers to the complex events that occur within the actual occasion. In the macrocosmic sense, organic relations refer to the interconnection of actual occasions and therefore are of a different character than those of the actual occasion, and require an additional set of concepts for their explication. In the present instance, the terminological problem is not very large since there is little chance of getting led too far astray by the difference in usage. The problem will, however, be more acute in future discussions; seeing it here in a rather neutral context should be of benefit at those times.

7.3.1 INTERCONNECTION

As we have seen, the final indivisible entities in the

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[448] Christian, _op_. _cit_., p. 158.

[449] Whitehead, _Process and Reality_, p. 151.

world are the momentary actual occasions that are connected by their prehensions of each other. Entities which are interconnected by their prehensions, that is, entities which "objectify" each other, however loose the connection may be, are said to form a "nexus."[450] It is the strength of interconnection that determines the character of a nexus. Nexūs[451] are strengthened into a "society" when there is a common eternal object in the prehensions of each actual occasion in the nexus. By virtue of this common defining characteristic, they may be said to have "social order."[452] The social order of a nexus provides an explanation of the way actual entities become coordinated into the "things" we know. For example, a molecule, a rock or an animal body are all examples of a type of a nexus that sustains itself with a certain type of order.

At this point, there is an interesting parallel to the hierarchical logic of the previous chapter. Whitehead observes, that since each society is brought together out of a larger background environment of actual occasions, societies do not exist in isolation and are, in fact, subject to the influence (open boundary conditions) of their social

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[450] Ibid., p. 24.

[451] The plural form is written, nexūs.

[452] Whitehead, Process and Reality, p. 39.

background.[453] Also, the laws which dominate the social environment of the nexus are said to be the result of the common defining characteristic of that background society.[454] Thus, the new comprehensive entity which is formed on the open boundary conditions of the lower level (social background), is not reducible to a description in terms of its parts or the defining properties of the lower-order society. Clearly, two of the three terms of hierarchical logic are evident in this account of nexūs. The third or higher-order term is present but submerged in this account since it is a factor functioning <u>within</u> the actual occasions of the nexus whereas, the other relations are concerned with the <u>without</u> or external relations between actual occasions.

To recap briefly, the concept of a society of actual occasions is seen to be one whose character can vary over a wide range of organization and complexity. Since everything that has gone before suggests that organization in the empirical world of "stubborn fact" should be thought of in hierarchical terms, it is not surprising to find that there is a hierarchy of societies. Now that we are dealing with the hierarchical relations of the societies that actually compose the world, it is important to pay attention to their character and a slight digression is required to demonstrate

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[453] <u>Ibid</u>., p. 108.

[454] <u>Ibid</u>.

Whitehead's thinking on this matter.

Since Whitehead always seems to catch an idea in its widest sweep, he defines the basis of the system of societies we know in our world, as but a part of a "vast nexus that extends far beyond our immediate cosmic epoch."[455] Thus, his cosmology would readily accept other epochs with vastly different social orders. On this view, the fact that our present epoch is characterized by three spacial and one time dimension, or a four dimensional space-time system, is something of an accident. That is, Whitehead's system provides no intrinsic reason as to why there are four dimensions in our epoch; there could just as easily have been five or fifteen dimensions. Such considerations serve mainly to help grasp the most general relations that prevail in our epoch. Whitehead does not bemoan the fact that there are only four dimensions in our system, he accepts it as an empirical fact that does not require logical demonstration. Now we can return to considering the character of the societies in our epoch.

Since all societies have the social relationship mentioned above, and since societies are hierarchical, the lowest societies in the hierarchy of our epoch must have the broadest application.

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[455] Ibid., p. 115.

> Thus the physical relations, the geometrical relations of measurement, the dimensional relations, and the various grades of extensive relations, involved in the physical and geometrical theory of nature, are derivative from a series of societies of increasing width (decreasing degree of order) of prevalence, the more special societies (higher, more ordered) being included in the wider societies. This situation constitutes the physical and geometrical order of nature.[456]

The important aspect of this, for our concern, is that the societal order that determines the order of nature, is at one and the same time the basis of the higher orders and is also formed by the same means as all higher orders, i.e., nexūs composed of actual occasions that are ordered by the effect of the eternal objects that they prehend. This realization will be of importance in subsequent contexts.

7.3.2 SOCIETIES

In moving to higher levels of the hierarchy, societies rapidly become more complex as the various levels from electrons to minerals, to vegetables, to animals, to man, are traversed. As soon as the complexity is great enough to support a society within a society, e.g., a molecule, societies become "structured societies."[457] Similarly, a molecule within a living cell is also a structured society such that the lower-order society within the higher-order one is

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[456] _Ibid._, p. 110.

[457] _Ibid._, p. 121.

said to be a "subordinate society."[458] In the simple case of a molecule, which is a society of actual occasions whose members are related serially, i.e., successive physical prehensions, the society is said to have a "personal order."[459] In this case, the personal order is of a low grade since the actual occasions which comprise the nexus are primarily involved in prehensions of their physical poles such that there is little opportunity for the introduction of novelty into the actual occasion. Such novelty, should it occur, would subsequently produce a change in the character of the nexus. Since the novelty does not arise, this type of nexus is called an "enduring object."[460] Thus, enduring objects may be seen as the basis of the stability of the material world. In fact, they are the material world. As a final step in this type of complexifying environment, there are "corpuscular societies"[461] that are composed of varying degrees of union between enduring objects.

All of these societies of whatever complexity are primarily characterized by the fact that they are specialized for their environments. That is, since they are not given to novelty, their complexity is such that it stands in a

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[458] Ibid., p. 118.

[459] Ibid., p. 40.

[460] Ibid.

[461] Ibid., p. 41.

constant relation to the wider social environment; hence, they are stable. Also, it should be stressed that the degree of interconnection, though stabilized within a given nexus, is highly variable across nexūs. Compare, for example, the internal relatedness of atoms in a diamond with those of a gas.

There is another type of highly complex society that is not stabilized into such inert relations with its environment. The living cell, for example, is a type of society that exhibits a changing relationship with its environment. According to the detailed account of actual occasions the only way that the novelty associated with living societies can be obtained is by the addition of conceptual prehensions at the mental pole of the actual occasions in the nexus. It thus becomes the definition of a living society that it is one in which there is at least some touch of novelty arising from the conceptual prehension of eternal objects.[462] In this way, mere repetition is transformed into basis for a living occasion.

Extension of the role of mentality as it functions within a nexus in the production of a living society, leads to consideration of the extreme case where there will be a living society such that all members of the nexus will have mental poles that introduce novel reactions to the

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[462] Ibid., p. 122.

environment. Since life is defined as involving at least a touch of novelty, a nexus that is entirely involved in novelty is said to be an "entirely living nexus."[463]

There is a shade of definition that is important to the difference between nexūs which are living and those which are not. A nonliving nexus is a society that forms an enduring object. That is, the endurance of the nexus is not intimately dependent upon the support of the environment. In the case of an entirely living nexus the situation is quite the opposite, since a living nexus must be thought of as one in which the final high-grade mentality of the living body is an outgrowth of the lower-order levels of nexus that comprise the various subordinate societies of the body system. Thus, it is maintained that the complex inorganic system of interaction is built up for the protection and maintenance of an entirely living nexus and that, in return, the original novel actions of the living elements in the system are protective of the character of the whole system.

There is, of course, a direct comparison between this relation of the living to the nonliving and the accounts of "cyclic causality" that were of such great value to Waddington and Piaget.[464] Clearly, there can be no mistaking

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[463] Ibid., p. 122.

[464] Cf., Chapter 6, Section 6.4.1.

the similarity of the two descriptions. Piaget, it will be remembered, maintains that:

> As soon as it is recognized that . . . the environment is just as much organized by the organism as phenotypic variation is directed by the environment, then it becomes possible to speak of "cybernetic circuits" . . . and development can be seen as a series of organizational ladders, all different and all perpetually subject to cyclic causality.[465]

By way of emphasizing the similarity, we see that Whitehead maintains that:

> A complex inorganic system of interaction is built up for the protection of the "entirely living" nexūs and the originative actions of the living elements are protective of the whole system. On the other hand, the reaction of the whole system provides the intimate environment required by the "entirely living" nexūs. We do not know of any living society devoid of its subservient apparatus of inorganic societies.[466]

It is important to note that the correspondence between the two systems of interpretation is a function of two entirely different levels of explanation. Whitehead, by his own admission is "conjecturing" about the character of living bodies based on the categories of his metaphysical system.[467] Piaget, on the other hand, is talking with reference to empirical fact that has emerged in recent biological and psychological science. Thus, just as it is possible to

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[465] Piaget, Biology and Knowledge, p. 135.

[466] Whitehead, Process and Reality, p. 122.

[467] Ibid.

demonstrate a comparability between organismic metaphysics and basic categories of physical phenomena, e.g., the vector transmission of physical energy,[468] there is also an important sense in which it can be maintained that organismic metaphysics also conform to the facts of the empirical biological sciences. Yet, it is also true that a correspondence with empirical data in this fashion does not exhaust the meaning of the metaphysics. In fact, the mutuality of the two views should lead to greater confidence in the applicability of the metaphysics in other areas of scientific activity, i.e., psychology and education.

Some of the additional meaning of the metaphysics can be shown as follows. By defining life as the result of the introduction of novelty not associated with the inherited data from the physical pole of experience, the phenomenon of life is not only inextricably bound up with physical phenomena, it is also given the property of responding to "values," i.e., the development of subjective aim and all that is implied by that process.[469] The additional metaphysical meaning is associated with the fact that life can not be thought of as something abstract from the animal body. That is, "entirely living" nexūs, exist only as a result of the protective environment provided by the animal

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[468] Cf., Chapter 7, Section 7.2.

[469] Cf., Chapter 7, Section 7.2.2.

body. In this sense, life must be thought of as the name for originality and not for tradition.[470] Thus, the idea of acting on and reacting to an environment can be viewed in a larger sense in which action and reaction are properties of all societies, living and nonliving. However, special attention to the character of living societies shows that their reaction to the environment is continued by conceptual experience which functions to adapt reaction so that it captures the maximum intensity of experience for the organism as it is confronted with a broad range of environmental circumstances. It is therefore asserted that the reaction of a living body is dictated by the present and not by the past; "It is the clutch at vivid immediacy."[471]

But vivid immediacy is not license to complete freedom of action. Living nexūs, those societies which are dependent upon the lower-order nonliving nexus, may be said to be a living person in the sense that they can sustain a thread of personal order from occasion to occasion; however, when such a society clutches at vivid immediacy the degree of originality is necessarily limited by its dependence upon the limits of the nonliving society. Thus, mental originality as manifest in personal mentality must adjust its functioning to insure the safety of the material organism

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[470] Ibid., p. 124.

[471] Ibid.

upon which it depends; "Thus life turns back into society: it binds originality within bounds, and gains the massiveness due to reiterated character."[472]

Finally, the assertion must be made that of the various examples of "entirely living" nexūs that support the personal order of a living person, the human body and its "entirely living" nexūs must be thought of in the sense that "our own self-consciousness is direct awareness of ourselves as such persons."[473]

Yet, if we take the metaphysics seriously, there is still something missing from an account that simply provides that life processes have a cyclic feedback nature such that physical order gives rise to mental originality which, in turn, is so structured as to protect the physical order. Organismic metaphysics also provides that the conceptual generation of novel mentality is a direct result of the relevance of God for the novel situation as it is expressed in the ordering of the eternal objects involved in the experience. It is therefore the case, that all mental originality in "the temporal world is conditioned, though not determined, by an initial subjective aim supplied by the ground of all order and of all originality."[474]

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[472]*Ibid.*, p. 127.

[473]*Ibid.*

[474]*Ibid.*

7.3.3 THE PRESIDING OCCASION

Examining some further implications of the account of living occasions given above, leads to an account of the complexity of the animal body that reaches the rather astounding conclusion that the functions of life within a living cell are associated with the empty space within the cell. "Life lurks in the interstices of each living cell, and in the interstices of the brain."[475] Associating life with empty space is a strange doctrine that requires some explanation. Fortunately, the more familiar logic of hierarchical relations will help since the concern really reduces to a form similar to the problem associated with the formation of a new comprehensive entity.

A living society, as a complex structure of inorganic societies which are woven together into the production of a new comprehensive (living) entity, may be said to be built upon the open boundaries of the material animal body. However, a comprehensive entity cannot be explained in terms of the lower-order operating principles which formed the open boundaries which support the integrated experiences of the whole animal. Thus, its conceptual reaction to the environment, which constitutes the unity of the animal as a comprehensive entity, must be thought of as existing in some place other than the space which is occupied by the lower-order

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[475] Ibid., p. 125.

entities. Clearly, since all the material entities (enduring objects) which comprise the animal body are restricted to pure physical prehension, the space which they occupy cannot be thought of as containing the novelty that is life itself.

The mainstay in the argument which Whitehead develops to account for this state of affairs is that it is God's purpose in the creative advance to evoke the intensities of experience that characterize the unity of life on each level of the hierarchy. He sums this up by saying:

> So far as the functioning of the animal body is concerned, the total result is that the transmission of physical influence, through the empty space within it, has not been entirely in conformity with the physical laws holding for inorganic societies. The molecules within an animal body exhibit certain peculiarities of behavior not to be detected outside the animal body. In fact, living societies illustrate the doctrine that the laws of nature develop together with societies which constitute an epoch.[476]

One final thing remains to be said about the order of nature that is the result of this view. By providing for the intimate interweaving of mental and physical experience, the way has been paved to understand the integrated experiences of the whole animal as they are summed into a "presiding occasion" of experience that is <u>not</u> necessarily

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[476] <u>Ibid</u>., pp. 125-126; cf. also, Chapter 7, Section 7.2.1 as regards the coordination of actual entities into an enduring personality.

restricted to any part of the body.

> Thus, in an animal body the presiding occasion, . . . is the final node, or intersection, of a complex structure of many enduring objects. Such a structure pervades the human body. The harmonized relations of the parts of the body constitute this wealth of inheritance into a harmony of contrasts, issuing into intensity of experience. . . . The human mind is thus conscious of its body inheritance. There is also an enduring object formed by the inheritance from presiding occasion to presiding occasion. This endurance of the mind is only one more example of the general principle on which the body is constructed.[477]

In coming to this description of the presiding occasion of human experience as it has developed out of the details of the microcosmic and macrocosmic accounts of the philosophy of organism, we have once again come to the position that was adopted in the first section of this chapter. That is to say, the enduring object that is formed by the inheritance from presiding occasion to presiding occasion, is the detailed cosmological way of phrasing the problem of "personal identity in a changing world of occasions [that] is the key example for understanding the essential fusion of the World of Activity with the World of Value."[478]

7.4 TWO MAJOR IMPLICATIONS FOR PSYCHOLOGY AND EDUCATION

The extended development of organismic relations

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[477] Ibid., p. 129.

[478] Whitehead, Immortality, p. 689.

considered in this chapter provides the basis for the following characterization of two topics which impact on contemporary psychology and education. Since these topics derive directly from organismic metaphysics, we may look upon them as the animating background of specific theoretical formulations and empirical investigations in exactly the same sense that the mechanistic world-view fostered the formulations of associationistic stimulus-response models of mental processes. No attempt need be made at this point to recount the history of psychological thought or to substantiate the assertions about its metaphysical parentage. That task has been addressed in Chapters One through Four. Also, in an important sense, the present concern is not with issues of metaphysics; instead, we are now faced with the derivation of an orientation toward the appropriate epistemology for an organismic psychology. Since the general impact of the organismic approach has been considered by interweaving its perspectives with the history of the first four chapters, and also by considering the interpretations of modern science and organismic relations of Chapters Five, Six and the first three sections of this chapter, the proper concluding discussion should now consider the basis for the organismic approach to psychological theory and educational practice.

The two major topics of this section are views of an organismic epistemology which derive from two distinct perspectives on the unity of human experience. The first topic to be considered focuses upon the organismic perspective of man's immanence in nature while the second topic opens consideration of the organismic assertions regarding man's transcendence of nature.

The following consideration of these two aspects of knowing attempts to state the issues at hand without introducing new evidence or elaborate reconsideration of previous material. The narrower aspect of immanence will be considered first before the broader topic of transcendence can enter as a concluding theme. Both these topics may be viewed as a more detailed account of the organismic psychology considered in Chapter Five.[479] Or, to be more accurate, the earlier organismic psychology may be seen as a philosophical interpretation of organismic metaphysics while the present discussion may be viewed as an epistemological interpretation of the same metaphysical orientation.

7.4.1 IMMANENCE

In focusing on man's immanence in nature from the organismic point-of-view as it impacts on concerns relevant to psychology and education, the basic fact to be considered is the source of man's knowledge about his environment.

In entering this discussion, the problem of the use of

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[479] Cf., Chapter 5, Sections 5.3.1 and 5.3.2.

terminology in the Whiteheadian scheme arises as an initial concern. As indicated above, in connection with the various characterizations applied to the concept of "eternal objects" and the separate meanings of the term "organism," the precise meaning of terms is often difficult to determine.[480] In the present instance there is an extreme example of this problem and one which appears to be a major factor in obscuring more detailed empirical investigation of the validity of theories deriving from organismic metaphysics. Also, the presence of a problem in terminology should alert concern as to the special nature of the thought which is so difficult to express.

Whitehead's position on the problem of everyday knowledge of the world is that there are three primary phases involved. The ordinary mode of experience is called symbolic reference which is considered to be a mixed mode of knowing deriving from the two more primitive modes of knowing considered earlier; namely, presentational immediacy and causal efficacy. Of these two, causal efficacy is the more basic. This is the mode that derives from physical prehensions of past data. It is therefore, the mode in which the inheritance of personal identity that involves all layers of the material body is transmitted into the present occasion of experience. Since Whitehead is always

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[480] Cf., Chapter 7, Sections 7.2.4 and 7.3.

cautious to contrast this mode of inheritance with the data derived from conceptual prehension at the mental pole of experience, i.e., presentational immediacy, he characteristically uses terms for the physical feeling of past data which emphasize its causal nature while at the same time denying or tending to deny any of the meanings associated with the other mode. Thus, causal efficacy is given descriptions such as vague, crude, inarticulate and massive as a way of characterizing this felt efficaciousness of the past.

His reason for doing this is that one of his primary insights into the nature of metaphysical knowledge involves the assertion that normal knowing as considered in past philosophy and science is really based on the mode of presentational immediacy. It is a primary characteristic of this mode of knowing the world that it is concerned with that which is highly articulate, vivid, and sharp. Thus, standard accounts of the world are couched in terms of isolation in space and time which also emphasize the separateness of the entities of the extensive world. These accounts of experience are primarily based on visual perception and consider the world in exclusion of the data which derive from the past.

Whitehead does not argue that the knowledge of the world which is derived from specific consideration of the extensive world is wrong, rather, he maintains that it is limited. The traditional emphasis is understandable since the higher phases of consciousness are those which dominate in our experience. It is also in this context that the familiar topics of "Misplaced Concreteness" and "Inversion" find their source and we can now sum up their meaning rather easily.

By relying on the previous detailed accounts of the microcosmic and macrocosmic relations of actual occasions, we can take the position that the final level of consciousness in human experience definitely involves the "objectification" of antecedent states of the human body as a basic element. Since these antecedent states are really actual occasions which exist on every level of the hierarchy that leads up to the final percipient event, i.e., normal consciousness, the character of those actual entities opens another important factor for consideration. Actual occasions are, as we have seen, dependent on the realm of eternal objects as the determinant of the social order of all enduring objects in the world. Thus, it can be maintained that the material enduring objects which comprise the human body are subject to the same requirements of possibility, as determined by the structuring of the eternal objects, as are the material enduring objects which are not part of the body. The importance of this realization is seen in the fact that the data which are handed along in causal efficacy are defined as having the same structure as the structure of the world which is known in the higher phase of experience or presentational immediacy. Thus, on the organismic view, the relations which we know to pertain between the things in the world are exemplified for us by two separate paths of knowledge which are grounded in the common determination of possibility in the real world.

A slight digression will help to clarify the above. Whitehead's cosmology is built upon the assumption that the world of fact requires some reason to be structured. While he is open to accepting any structure that has developed as an empirical fact, his concern is to describe a mechanism by which some limitation can be placed on the world of fact if entities of specific characters are to develop. That is, there must be a reason for the development of a specific realization of Value in Fact. He proposes a solution to this problem that asserts that each actual entity contains a reference to the realm of graded value (eternal objects) that is the basis for the structure of the world. Thus, a basic fact like the construction of the physical world in terms of three dimensions has also been determined in this way. In fact, all of the basic determinants of the structure of the world we know in visual perception, which is most of what we know about the world, may be said to be represented through the inheritance of the body as well as through visual perception.

To return to the problem of epistemology, it can now be asserted that Whitehead's use of terms such as heavy, vague, crude, etc., as regards the character of inheritance from the physical past (causal efficacy) is somewhat misleading. It is misleading in the sense that it implies that there can be no specific content in this sort of knowledge whereas, the exact opposite is the case. When he talks of vagueness and crudeness his primary reference is to a comparison with higher forms of consciousness, i.e., presentational immediacy and he does not mean to imply that there is no specific information as to the actual construction of the world which is derived from this source. The information as to the true structure of the world which is supplied in causal efficacy is as precisely determined by the realm of eternal objects as is the information which is supplied by the input of visual perception in the mode of presentational immediacy. This is true since from the accounts of the actual occasions given above, there is absolutely no grounds on which to assume that there is any arbitrariness involved in the way an actual occasion prehends the defining aspects of the realm of eternal objects.

Thus, it can be maintained that the visual experience of a young child for example, is determined not only by the enduring object he is looking at but also by his bodily inheritance which has been structured by the properties of the same environment from which the enduring object arises.

It is this characterization of conscious experience that derives from two decidedly different modes of knowing the world that can be the basis for theories relevant to psychology and education. The organismic assertion that experience is structured from within as well as from without while not also involving predetermination of experience, suggests important implications for psychological theory especially in the areas of cognition and perception. Similarly, traditional approaches to education which are also thoroughly grounded in the type of empiricism that derives from the analysis of higher grades of consciousness in exclusion from the causal aspects of knowledge of the world, can be modified so that undue emphasis is not placed on "basic" concepts that are given as a result of being an organism in a world of real organisms.

While the content of this section does no more than to open the possibility that other approaches to the problem of epistemology are possible, there are many levels of complex description contained in Whitehead's philosophy that can well serve the cause of supporting a detailed investigation of the issues involved.

The need for investigations of this type is amply demonstrated by the following example of the approach to knowledge that is current in the contemporary world of education. Jerome Bruner maintains:

> Knowledge is a model we construct to give meaning and structure to regularities in experience. The organizing ideas of any body of knowledge are inventions for rendering experience economical and connected. We invent concepts such as force in physics, the bond in chemistry, motive in psychology, style in literature as means to the end of comprehension.[481]

The intent of this quotation is not to attempt to label Mr. Bruner an empiricist of the Lockean variety. Rather, it is to assert that without the larger aspect of a more complete view of knowledge which is provided by the comprehensiveness of organismic metaphysics, there will always be a pronounced tendency to look upon knowledge as a mere model which is constructed "to give meaning and structure to regularities" that do not have any apparent relationship to the meaning and structure of life as it is experienced. The position which is taken here is that in order to have meaning and structure in experience, the knower must believe that his own being is a part of the beingness of the rest of the world. Thus, considering knowledge as a mere model of the world, one that is not also related to the realities of the evolving cosmos, is antithetical to supporting a position

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[481] Jerome Bruner, On Knowing (Cambridge: Harvard University Press, 1964), p. 120.

from which the knowing subject can establish a relation to the other aspects of his nature that transcend his immediate awareness.

7.4.2 TRANSCENDENCE

The second major topic which derives from the organismic position and which impacts on psychology and education concerns the possibility that there are other grounds for knowing the realities of the evolving cosmos than the type of knowledge which is derived from perceiving the realities of the world realized fact.

In the organismic scheme it is necessary to consider this topic as an aspect of the more general topic which concerns the rôle of God in the unfolding events in the world. Whitehead's position is that God is the primordial ground of order and is therefore involved in the subjective aim of every actual occasion. In this way, the organismic scheme defines God's role as that of eliciting the self-creation of individual entities in a way that allows for freedom as well as structure and directionality in the processes of the universe.

The function of God's immanence in the world is especially important to man as the highest evolved creature. Here, the graded relevance of possibility which is provided by God as the ground of all order also functions as a lure for actualization within the process of the individual. In this way, God is also the ground of all novelty.

Thus, the influence of God in the world of organismic metaphysics is seen to be limited to the extent that his valuation of possibility is experienced by the world. In other words, the flowering of man's potential is a direct function of the degree to which man actualizes the inevitable ordering of things as they exist in the nature of God.

Since the entire structure of organismic metaphysics requires the defining rôle of God to be both the ground of order and the ground of novelty, and since the realized order of the world is included in the subordinate levels of the being of man, it follows that the presiding occasion of consciousness, which is man's awareness of his bodily inheritance, should also be primarily involved in the conceptual prehension of the increased grades of value which it is God's nature to provide.

The important aspect of this discussion for the present topic involves the fact that if any use is to be made of the systematic nature of organismic metaphysics within the fields of psychology and education then, it is absolutely necessary to admit that the ultimate determinant of the meaning and structure of life is not a set of arbitrary principles that have been created to simplify the relationships observed in the world. The structure of the world is a gift of our physical inheritance of the world of created fact, an inheritance which is manifest in the processes of knowing the subordinate world. On this view, educating the conceptual process of children does not amount to the creation of relationships which are unavailable to the child. Rather, the process is one of raising to the level of explicit recognition the characteristics of realized Value in Fact that are a natural part of his physical inheritance.

However, just as organismic metaphysics can provide no grounds upon which to assert that there must necessarily be three spacial dimensions rather than thirty, no reason can be given for limiting the extent to which it is possible for the subjective reaction of the experient individual to be influenced by the higher grades of value which are also a part of God as the primordial ground of order. It therefore seems quite reasonable that the solution to many of the perplexing problems in the psychology of personality and the processes of education, is located in the increased subjective realization by the experient individual, of the grades of value that border the upper level of his awareness. Thus, when the structure of the knowledge is in harmony with the true character of realized value that forms the subordinate orders of his own being the child will experience a sense of deepened awareness that provides its own motivation toward greater understanding. It is in this sense that knowledge may be said to be relevant to the learner.

The ultimate importance of man's transcendent nature lies not in the realization of the conceptual exemplification of values which structure the realized grades of existence but in the creative appeal to increased depth of experience that comes with spiritual insight into the purposiveness of God's valuation of a new order of achievement for man to obtain. It is in this sense that the philosophy of organism may be said to be open to the possibility of religious experience as it has been known down through the ages of mankind's existence. A primary value then, of the organismic approach is that it opens God's participation in all levels of nature. For man, at the top of the hierarchy, there is prayer and meditation as the primary means of knowing the increased grades of value that constitute the advance of humanity and are the vehicle of his transcendence.

And should it happen, as it periodically does, that mankind is given fresh insight into the Purposes of God for man; then, he has the words of the Prophet to assure him and guide him in the knowledge that his deepest urgings are not simply idle fancies and vain imaginings. [¿Qué le pasó a la razón? -ésto es pura fé.]

> Create in me a pure heart, O my God, and renew a tranquil conscience within me, O my Hope!
>
> Through the spirit of power confirm Thou me in Thy Cause, O my Best-Beloved, and by the light of Thy glory reveal unto me Thy path, O Thou the Goal of my desire!
>
> Through the power of Thy transcendent might lift me up unto the heaven of Thy holiness,

O Source of my being, and by the breezes of Thine eternity gladden me, O Thou who art my God!

Let thine everlasting melodies breathe tranquility on me, O my Companion, and let the riches of Thine ancient countenance deliver me from all except Thee, O My Master, and let the tidings of the revelation of Thine incorruptible Essence bring me joy, O Thou Who art the most manifest of the manifest and the most hidden of the hidden![482]

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[482] Bahá'u'lláh, Bahá'í Prayers (Wilmette: Bahá'í Publishing Trust, 1957), p. 76.

Unfortunately, the author's biases are presented
as part of a unification theory. However work
very significant in its monumental scope. Author
appears to transcend any advocacy, personal "interpretative
framework" throughout text, except very near
the end. Author, in an exceptional jesture
allows his "non-academic" personality and identity
known to the reader - Overall Excellent!

BIBLIOGRAPHY

Allport, Gordon, ed. The Fruits of Eclecticism: Bitter or Sweet?. The Person in Psychology. Boston: Beacon Press, 1968.

Bahá'u'lláh. Bahá'í Prayers. Wilmette: Bahá'í Publishing Trust, 1957.

Barbour, Ian G. Issues in Science and Religion. Englewood Cliffs, New Jersey: Prentice Hall, 1966.

Becker, Charles L. The Heavenly City of the Eighteenth Century Philosophers. New Haven: Yale University Press, 1932.

Boring, Edwin G. A History of Experimental Psychology. New York: Appleton-Century-Crofts, 1929.

Bridgman, Percy. The Logic of Modern Physics. New York: Macmillan, 1927.

Bronowski, J. Science and Human Values. New York: Julian Messner, 1956.

________. The Common Sense of Science. New York: Harper and Row, 1960.

Bruner, J. On Knowing. Cambridge: The Harvard Press, 1964.

Bugental, J. F. T. The Search for Authenticity. New York: Holt, Reinhart and Winston, 1965.

________, ed. The Challenge that is Man. Challenges of Humanistic Psychology. New York: McGraw-Hill, 1967.

Burtt, Edwin A. The Metaphysical Foundations of Modern Physical Science. London: Routledge and Kegan, 1932.

Butterfield, Herbert. The Origins of Modern Science, 1300-1800. London: G. E. Bell and Sons, 1967.

Campbell, Norman. What is Science?. London: Methuen and Co., 1921.

Capek, M. The Philosophical Impact of Contemporary Physics. Princeton, N. J.: D. Van Nostrand Co., 1961.

Cronback. Lee J., and Meekl, Paul E. "Construct Validity in Psychological Tests." Psychological Bulletin, LII (1955).

Descartes, René. Descartes' Philosophical Writings. Edited and translated by N. K. Smith. London: Macmillan, 1952.

Eddington, Arthur. The Philosophy of Physical Science. Cambridge: Cambridge University Press, 1949.

Einstein, Albert. The Fundaments of Physics. Readings in the Philosophy of Science. Edited by Herbert Feigl and May Broadbeck. New York: Appleton-Century-Crofts, 1953.

Fechner, Gustav. Elements of Psychophysics. Translated by H. E. Adler. Edited by D. H. Howes and E. G. Boring. Vol. I. New York: Holt, Reinhart and Winston, 1966.

Frank, Phillip. Philosophy of Science. Englewood Cliffs, N. J.: Prentice-Hall, 1957.

Gibson, James J. The Senses Considered as Perceptual Systems. Boston: Houghton Mifflin Co., 1966.

Gilkey, Langdon. Master of Heaven and Earth. Garden City, N.Y.: Doubleday, 1959.

Hardy, Alister. Another View of Evolution. Biology and Personality. Edited by I. I. Ramsey. Oxford: Basil Blackwell, 1965.

Harris, Errol. The Foundations of Metaphysics in Science. New York: Humanities Press, 1965.

Heisenberg, Werner. Physics and Philosophy. New York: Harper and Row, 1958.

Hernstein, Richard J., and Boring, Edwin G. A Source Book in the History of Psychology. Cambridge: Harvard University Press, 1965.

Hodges, H. D. The Philosophy of Wilhelm Dilthey. London: Routledge and Kegan Paul Ltd., 1952.

Hull, Clark L. A Behavior System. New Haven: Yale University Press, 1952.

Huxley, Julian. Evolution in Action. New York: The New American Library, 1957.

Jaki, Stanley L. The Relevance of Physics. Chicago: The University of Chicago Press, 1966.

James, William. The Principles of Psychology. Vol. I. New York: World Publishing, 1892.

________. Some Problems in Philosophy. New York: Longmans, Green and Co., 1911.

________. The Dilemma of Determinism. The Will to Believe. New York: Longmans, Green and Co., 1921.

Jones, W. T. A History of Western Philosophy. New York: Harcourt, Brace and World, 1952.

Kaam, A. Vann. Existential Foundations of Psychology. Pittsburg: Duquesne Univ. Press, 1966.

Keller, Helen. The Story of My Life. New York: Dell Publishing Co., 1969.

Koch, Sigmund. Psychology: A Study of a Science. Vol. III. New York: McGraw-Hill, 1959.

________. Psychology and Emerging Conceptions of Knowledge as Unitary. Behaviorism and Phenomenology. Edited by Donald T. Wann. Chicago: University of Chicago Press, 1964.

J ________. Value Properties: Their Significance for Psychology, Axiology, and Science. Toward a Unity of Knowledge. Edited by Marjorie Grene. Psychological Issues. Vol. VI, No. 2, Monograph 22. New York: International Universities Press Inc., 1969.

Koestler, Arthur. The Sleepwalkers. New York: Grosset and Dunlop, 1963.

Koyré, Alexander. From the Closed World to the Infinite Universe. Baltimore: The Johns Hopkins Press, 1957.

Kuhn, Thomas S. The Structure of Scientific Revolutions. Chicago: The University of Chicago Press, 1962.

________. Logic of Discovery or Psychology of Research?. Criticism and the Growth of Knowledge. Edited by

I. Lakatos and A. Musgrave. Vol. I. Cambridge: Cambridge University Press, 1970.

Laplace, Pierre Simon. A Philosophical Essay on Probabilities. New York: Dover, 1961.

Locke, John. An Essay Concerning Human Understanding. Edited by A. C. Fraser. Oxford: Clarendon, 1894.

Lovejoy, Arthur O. The Great Chain of Being. Cambridge: Harvard University Press, 1936.

Lowry, Richard. The Evolution of Psychological Theory. New York: Aldine-Atherton, 1971.

Lyons, J. Psychology and the Measure of Man. London: Free Press, 1963.

McDougall, William. Physiological Psychology. London: Dent, 1905.

________. Outline of Psychology. New York: Scribner's and Sons, 1923.

Margenau, Henry. The Nature of Physical Reality. New York: McGraw Hill, 1950.

Marx, M. H., and Hillix, W. A. Systems and Theories in Psychology. New York: McGraw-Hill, 1963.

Maslow, Abraham. Motivation and Personality. New York: Harper and Row, 1954.

Mayr, Ernst. The Nature of Life. New York: Athenum, 1962.

Miller, George A. Psychology. New York: Harper and Row, 1962.

Mumford, L. The Myth of the Machine. New York: Harcourt, Brace, Jovanovitch, 1970.

Nagel, Ernest. Structure of Science. New York: Harcourt, Brace and World, 1961.

Needham, Joseph. Science and Civilization in China, II, History of Scientific Thought. Cambridge: Cambridge, University Press, 1956.

Northrop, F. S. C. The Logic of the Sciences and the Humanities. New York: Macmillan, 1947.

Pearson, Karl. _The Grammar of Science_. New York: Macmillan, 1927.

Piaget, Jean. _Biology and Knowledge: An Essay of the Relations Between Organic Regulations and Cognitive Processes_. Chicago: University of Chicago Press, 1971.

Polanyi, Michael. _Personal Knowledge_. New York: Harper and Row, 1964.

________. _Science Faith and Society_. Chicago: University of Chicago Press, 1964.

________. _Life's Irreducible Structure_. _Knowing and Being_. Edited by Marjorie Grene. Chicago: The University of Chicago Press, 1969.

Pribram, Karl H. _The Neuropsychology of Sigmund Freud_. _Experimental Foundations of Clinical Behavior_. Edited by A. J. Bachrach. New York: Basic Books, Inc., 1970.

Rancurello, Antos C. _A Study of Franz Brentano_. New York: Academic Press, 1968.

Rogers. Carl R. _On Our Science of Man_. _Man and the Science of Man_. Edited by William Coulson and Rogers. Colombus, Ohio: C. E. Merrill Company, 1968.

Sanford, Nevitt. _Will Psychologists Study Human Problems?_. _American Psychologist_, XX (1965).

Schilling, Harold K. _Science and Religion_. New York: C. Scribner's Sons, 1962.

Schultz, Donald P. _A History of Modern Psychology_. New York: The Academic Press, 1969.

Sherburne, Donald W. _A Key to Whitehead's Process and Reality_. Bloomington: Indiana University Press, 1966.

Simpson, George G. _The Meaning of Evolution_. New Haven: Yale University Press, 1949.

________. _This View of Life_. New York: Harcourt, Brace and World, Inc., 1964.

Sinnott, Edmund W. _Two Roads to Truth_. New York: Viking Press, 1953.

________. Matter, Mind and Man. New York: Atheneum, 1968.

Skinner, B. F. Science and Human Behavior. New York: The Macmillan Co., 1956.

________, and Ferster, C. B. Schedules of Reinforcement. New York: Appleton-Century-Crofts, 1957.

Spranger, Edward. Types of Men. Translated by J. P. W. Pigors. Halle: Niemeyer Publishing, 1928.

Sullivan, John. Franz Brentano and the Problem of Intentionality. Historical Roots of Contemporary Psychology. Edited by Benjamin J. Wolman. New York: Harper and Row, 1968.

Teilhard de Chardin, Pierre. The Phenomenon of Man. New York: Harper and Row, 1961.

________. The Future of Man. New York: Harper and Row, 1969.

Waddington, C. H. The Ethical Animal. Chicago: The University of Chicago Press, 1960.

________. The Nature of Life. New York: Atheneum, 1962.

Watson, John B. "Psychology as the Behaviorist Views it." Psychological Review, XX (1913).

________. Behavior: An Introduction to Comparative Psychology. New York: Holt, 1914.

________. Behaviorism. New York: Norton, 1924.

________, and McDougall, William. The Battle of Behaviorism. New York: Norton, 1929.

Weizsacker, C. G. von. The Relevance of Science. New York: Harper and Row, 1964.

Wheelis, A. The End of the Modern Age. New York: Basic Books, 1971.

Whitehead, Alfred North. The Function of Reason. Boston: Beacon Press, 1958.

________. Symbolism: Its Meaning and Effect. New York: Capricorn Books, 1959.

________. Science and the Modern World. New York: The Free Press, 1967.

________. Adventures of Ideas. New York: The Free Press, 1967.

________. Modes of Thought. New York: The Free Press, 1968.

________. Process and Reality. New York: The Free Press, 1969.

Woodworth, Robert S., and Sheehan, Mary R. Contemporary Schools of Psychology. New York: The Ronald Press, 1964.

Wright, Sewall. Philosophy of Biological Science. Process and Divinity. Edited by Reese and Freeman. Lasalle: Open Court, 1967.

Wundt, Wilhelm. Principles of Physiological Psychology. Translated by Edward B. Titchener. Vol. I. New York: Macmillan, 1904.

________. Elements of Folk Psychology. Translated by E. L. Schaub. New York: Macmillan, 1916.